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Remarks
ON THE
SCOPE AND TECHNIQUE OF MYOMECTOMY.

A paper read at the Section of Obstetrics and Gynæcology of the Royal Society of Medicine, Oct. 5th, 1922,

BY VICTOR BONNEY, M.D., M.S., B.Sc. LOND., F.R.C.S. ENG.,
ASSISTANT GYNÆCOLOGICAL SURGEON, MIDDLESEX HOSPITAL; SURGEON, CHELSEA HOSPITAL FOR WOMEN, ETC.

I TAKE it there can be no dispute that in principle myomectomy fulfils a higher surgical ideal than hysteromyomectomy. The preservation of the potentiality for reproduction, the conservation of that influence which the uterus is claimed by some to have on the ovaries, or even on the whole economy, by nerve connexion or internal secretion, and the avoidance of a hurt to sentiment that may be both deep and harmful, are advantages which I need not labour here. In practice every thinking surgeon would prefer to save the uterus, providing it was otherwise healthy, could he be reasonably sure that removal of the tumour alone would cure the patient with equal safety and surety. For a good many years I have been gradually breaking away from the teaching that, in the general, limited the positive indications for myomectomy to a single tumour, in a patient under 40 years of age, either pedunculated or at least not deeply imbedded, and not giving rise to excessive menstrual bleeding, nor undergoing degeneration; and in 1918 I published a paper[1] in which I urged an extension of the scope of myomectomy to include many cases usually dealt with by hysterectomy. The accepted limitations of myomectomy were established in 1898 when Alexander, of Liverpool, a man in advance of his time, read a paper before the old Gynæcological Society giving the details of 11 cases of this operation, in one of which he had removed as many as 25 tumours from the uterus. The feeling of the meeting was dead against him—rightly, perhaps, at a time when the far easier operation of hysterectomy was still largely unexplored and unperfected. In the 24 years that have elapsed since then the treatment of fibroids by removing the uterus has reached and passed its zenith and the theoretically better operation of removing the fibroids and conserving the uterus claims increasing attention. The wheel has turned full circle.

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Number of Tumours.

I have analysed the 100 operations according to the number of tumours removed at each operation; the figures are as follows (O = Operation; F = Fibroids removed):—

O.	F.	O.	F.	O.	F.	O.	F.
1	30	4	14	4	8	5	4
1	21	1	11	2	7	10	3
1	17	2	10	2	6	10	2
1	15	1	9	6	5	49	1

In counting the number of fibroids removed at each operation I have included those of every size down to those as small as a mustard seed—not with a view to magnifying the achievement, but because the removal of these small tumours, as well as the large ones, is the essence of the success of the operation; moreover, the removal of the seedlings is often much more difficult than the removal of the large tumours. One is only able to feel such small masses because the surrounding muscular capsule makes them much larger to the touch than they prove to be after enucleation. The largest number of fibroids that I have removed from a single case is 30, but I do not regard this figure as necessarily the limit. Of course, one occasionally meets with cases in which a very large number are contained in the uterus; Bland-Sutton recorded years ago one in which over 100 were present, and in such their removal without the uterus would be impossible, but I should certainly say that, given a suitable case, more than 30 could be successfully enucleated. It might be thought that after the removal of so many fibroids the uterus would be so hacked about as not to be worth conserving, but this is not so, as I shall proceed to show.

Position of Tumours.

The question of whether the tumour is subperitoneal, interstitial, or submucous is of little moment, but a sessile subperitoneal tumour, especially when large and of the superficial plaque variety, leaves a shallow bed not always easy to close satisfactorily. A submucous tumour usually means making a hole in the endometrium stretched over it, but this is not a serious matter. With an interstitial tumour, on the other hand, tearing of the endometrium should not occur, while the closing of the cavity is rendered easy by the thickness of the tissue that surrounds it. The position of the fibroid relative to the uterus as a whole is much more important. In the first place, anterior tumours are much more favourably placed than fundal tumours, and still more than posterior tumours, because they only involve making a straightforward anterior incision—the ideal position, for reasons I will refer to later. Fundal or posterior tumours, though in some cases they can be easily extracted through an anterior incision, require in other cases much more skill in order to avoid a stitched wound or stitch-holes on the posterior peritoneal surface of the uterus; sometimes, indeed, it is impossible to avoid them. Tumours growing laterally have the disadvantage that to get them out the uterine artery may need to be divided, but tumours growing in the broad ligament enucleate easily. The least advantageously-placed tumours are those growing in the cervical portion of the uterus, because the elongation of the cervix they produce is difficult to deal with after removal of the tumour. A posterior cervical fibroid of considerable size, fairly imbedded—especially if the capsule is very vascular—is the most difficult problem of all.

Degeneration.

Malignant degeneration and necrosis or suppuration due to sepsis are conditions which, of course, bar the operation but, with one other exception, the fact that a fibroid is undergoing degeneration does not affect the question of its removal without the uterus. I have at various times enucleated fibroids undergoing "red," pseudomucinous, cystic, or calcareous degeneration. The most interest attaches to "red" degeneration, which has been considered by some as an infective condition on account of the pain and fever to which it often gives rise. I have enucleated red degenerate fibroids on six occasions; in each case the typical symptoms were present, and in five of them the symptoms supervened suddenly in association with pregnancy. All the patients recovered uneventfully after operation—which proves, I think, that in this form of degeneration the fever is due to absorption of a toxin formed, not by bacterial action, but by the breaking-down tissue. The remaining exception is nævoid degeneration, in which a number of blood spaces are formed in the substance of the fibroid, whilst the capsule surrounding it is intensely vascularised, like the uterine wall in the region of the placental site, and the main vascular leashes of the uterus are immensely enlarged, especially the veins. The enucleation of such tumours—especially when they are large—is accompanied by such great bleeding that the operation at all times requires great consideration, and should certainly not be attempted where the fibroid is unfavourably placed.

[1] Brit. Med. Jour., March 9th, 1918.

Pregnancy.

Pedunculated fibroids, or fibroids superficially situated on the anterior walls of the uterus, and fibroids in the broad ligament, can be removed without great risk of disturbing a pregnancy, but the more deeply imbedded they are the greater is the risk of provoking uterine contractions; whilst to be able to carry out multiple myomectomy in the pregnant uterus with reasonable hope of saving the pregnancy is rare. Moreover, if deep enucleation is performed whilst the pregnancy is still in situ the bleeding from the cavity left is profuse and difficult to control, because the pregnancy prevents the uterine tissue retracting, and the passage of sutures sufficiently deep to approximate the walls of the cavity may be impossible, short of passing them through the whole thickness of the uterine wall and disturbing the pregnancy. On the other hand, the recently delivered uterus is peculiarly favourable for enucleation, because of the retractile state of the musculature.

The proper course, therefore, in these cases of deeply seated tumours—as also in most of the cases of multiple tumours—is to treat the pregnancy as an additional tumour, remove it by Cæsarean section, and then utilise the uterine incision to remove the fibroids, or as many as possible, through it. For even if the child be not viable, it is better to ensure a good recovery from the operation, so that the patient may be placed in the best possible state for future pregnancy, than to take the risk of post-operative hæmorrhage or post-operative miscarriage, either of which may endanger smooth convalescence and leave the parts in a state in which future pregnancy is unlikely or impossible. In my series of cases 11 of the patients were pregnant, and in five of these the removal of fibroids, totalling respectively 14, 5, 5, 5, and 1, was preceded by the removal of a living viable child, whilst of the remainder five had removed, respectively, 30 fibroids and a 3 months' pregnancy, 21 fibroids and a 3 months' pregnancy, 14 fibroids and a 3 months' pregnancy, 10 fibroids and a 4 months' pregnancy, and 1 fibroid and a 2 months' pregnancy, and one had 3 fibroids removed and the pregnancy successfully left in situ.

Accompanying Menorrhagia.

Patients suffering from profound anæmia due to fibroids should not be treated by myomectomy, because in them the continuance of even normal periods is undesirable, so much is their blood content depleted and their blood-forming mechanism enfeebled. Moderate menorrhagic anæmia, however, does not contra-indicate myomectomy, provided the operation is carried out so that all the tumours are removed and that the uterus left behind is not too big for the involution that occurs after myomectomy (as after childbirth) to restore it to normality. One of the risks urged against myomectomy is that of menorrhagia continuing after the operation, but where this occurs I believe it is nearly always due to the surgeon's failure to achieve these two desiderata; for though a diffuse fibrotic state of the uterine musculature may coexist with fibroids, experience shows it to be rare; on the contrary, the uterine muscle is nearly always conspicuously healthy and well-developed. This is probably largely owing to the fact that patients with fibroids have had few, and oftener no children, and that many of them are unmarried, so that they have commonly escaped the factors making for fibrotic degeneration.

In all cases of fibroids with menorrhagia where myomectomy is performed the uterine cavity should be opened in order to make certain that no small fibroid on the mucous surface, or mucous polypus, or great thickening of the endometrium is missed. Mucous polypi are very common with fibroids, and owing to their soft consistency they cannot be palpated through the uterine wall as a fibroid can, whilst a thickened endometrium must be seen to be discovered. For the scraping away of thickened endometrium through an incision in the uterine wall I have found the steel "finger nail" formerly used for the removal of adenoids very efficacious.

RESULTS OF OPERATION.

Risk.

I had two deaths in my series, a mortality of 2 per cent. The mortality rate of hysterectomy for fibroids at Chelsea Hospital for Women for the years 1905–1918 inclusive was 1·5 per cent., whilst many individual accomplishments of 100 hysterectomies without a death are on record. In comparing the risks of the two operations, however, I should like to emphasise that neither of the deaths in my series ought to have occurred. The first patient was a woman little over 30 years of age, who had a single anterior interstitial fibroid which enlarged the uterus to the size of a seven months' pregnancy. I enucleated it through an anterior incision, cut away the excess of uterine tissue which covered it, and sutured and ventrofixed the uterus without incident, except that the capsule was very vascular. I was called to see her five days later, on account of symptoms of intestinal obstruction, the patient being very ill. On reopening the abdomen I found it full of blood which had leaked from one of the suture holes of a main mattress suture. Death in this case was due to the overlooking of a hæmorrhage too slow to present the ordinary symptoms of internal bleeding. Had it been recognised and dealt with in time the patient would not have died. The second patient also had a very large interstitial fibroid, together with a two months' gestation, the combined mass being as large as an eight months' pregnancy. The fibroid was nævoid, and unfortunately I did not temporarily clamp both uterine arteries as well as both ovarian arteries, as I should do now. The result was excessive bleeding, which hurried me whilst removing the pregnancy and fibroid. The uterine wall after the enucleation was very redundant, and I did not cut it sufficiently freely away, so that the suturing took much longer than it should have done; when I had finished it I still had an organ much too big—which, however, I returned to the abdomen, as the patient by this time had a very rapid pulse. She died of shock. I record this series of mistakes to help those who may have to deal with a similar case.

The chief risk of an extensive myomectomy is hæmorrhage during and after the operation. It can be guarded against by temporarily securing the main vessels going to the uterus; by properly placing the sutures, and by cutting away sufficient tissue to leave an organ of manageable size to suture up. It must also be borne in mind that when hæmorrhage does occur after the operation it is in the nature of a slow dribble or ooze which produces not the classical symptoms of internal hæmorrhage but rather those of peritonitis or intestinal obstruction. Had I again to perform these two operations, knowing what I now know by unfortunate experience, the results would be different.

Ultimate Results.

I have not investigated the after-history of my cases of myomectomy with the thoroughness with which my colleague, Arthur Giles, has followed up the after-histories of his, the results of which you will hear presently, but I have been in touch with most of the patients, either directly or through their medical men, and I have not had one bad report. In no case that I know of have further fibroids appeared, nor have any of the patients been sent back to me on account of continuance or reappearance of menorrhagia. It may be suggested that such happenings have occurred, but that the patients, disgusted at not being cured, have gone elsewhere. I do not think so, because a large proportion of the patients in this series were cases operated on privately, mostly for old clients of mine from whom I should have heard quickly enough about my failures; on the contrary, the reports have been uniformly satisfactory, and broadly comparing the outcome of my myomectomies with the outcome of my hysterectomies as far as either have been brought to my notice, I affirm that the former operation has been at least as satisfactory

as the latter. On three occasions I have had the opportunity of viewing through an abdominal incision a uterus from which I had removed multiple fibroids some years previously. In one case I had removed seven fibroids, and in the other two five fibroids each, and in all the uterus appeared normal.

As regards pregnancy, five patients to my knowledge have had, and others may have had, a child since the operation. Of these, one had 14, another 8, and another 5 fibroids removed, and two had 1 fibroid each removed. All had successful deliveries by the normal passage except the patient with five fibroids, and she I delivered by Cæsarean section, partly at her own desire and partly (it was one of my early cases) because I was not certain how the uterine scar would stand the strain of labour. I found, however, that the uterus was normal, nor could I see a trace of my former operation, and there is no doubt she could have delivered herself.

TECHNIQUE OF THE OPERATION.

In myomectomy asepsis is very important, especially when many tumours have to be removed, for in such cases the collective area of the cavities left by the enucleation amounts to that of a large wound and the quantity of suture material used is considerable. The uterus delivered through the abdominal wound should therefore be protected from contact with the skin by rubber sheeting and towels, and the vagina should be sterilised as far as possible by a strong antiseptic. I use violet green for this. For suture material I use both silk and catgut, silk for the deep mattress sutures, taking much tension, and catgut for the superficial sutures.

Hæmostasis is as important as asepsis in these operations and it is essential to see that the incision or incisions in the uterus are well closed. The method I commonly employ is the same as that I use for Cæsarean section; a layer of deep mattress sutures of silk, a superficial continuous suture of catgut, and between them often, but not always, a layer of interrupted or continuous catgut mattress suturing. A well sewn-up uterine incision should show a slight degree of blanching of the tissues superficial to the deep mattress suture.

Incision.

As regards the position of the incision in the uterus, Alexander enunciated the correct principle 24 years ago—i.e., a single anterior incision and extraction of all the tumours through that one incision. An anterior incision has these great advantages: If post-operative bleeding occurs the blood accumulates in the utero-vesical space, and intestine is least likely to adhere in consequence of it; if the operator doubts that the incision is blood-tight he can suture it to the anterior abdominal wall or the back of the bladder and render it safe. The advantages of a single incision are manifest; it reduces the area of possible blood leakage and intestinal adhesion to a minimum, and these are the two principal risks to be guarded against. When Alexander stated that it was possible to remove many tumours through a single anterior incision, even if some of them were situated in the posterior wall, his assertion was received with scepticism, but it is quite true as a rule.

The fibroid most easily accessible through an anterior incision should be first attacked, and the incision should be carried right into the substance of the tumour so that there is no difficulty in finding the plane of cleavage between tumour and capsule. The fibroid having been enucleated the next most accessible should be reached by a secondary incision starting in the wall of the cavity left by the first tumour. The scalpel should be boldly thrust down to the tumour and the finger should then be thrust down the same track till the fibroid is reached, when the plane of cleavage can be sought for. Very often the tumour can be entirely freed before a volsellum is passed down to haul it out.

Fibroids are often quite movable in the uterine wall, and can be manipulated by the fingers of the left hand to a position convenient for making a track down to them. In this way tumours of the posterior wall can be reached by a track which skirts round the uterine cavity but does not open it. It might be thought that serious bleeding would often occur from the wall of these tracks, but it does not, unless in the making of a very lateral track the uterine artery be wounded. In such an event the bleeding can quite easily be controlled by putting a couple of ligatures round the artery above and below the track in the same manner as the artery can be ligatured before the amputation in hysterectomy.

Some posterior fibroids are best got out through the cavity of the uterus. There is no objection to opening the cavity of the uterus; indeed, as I have stated, it should always be done where menorrhagia is a symptom. It is most important to search the uterus thoroughly so as to be sure at the conclusion of the operation that no fibroids have been missed. The organ should be palpated very carefully between the finger and thumb, one of which should be inserted into the enucleation cavity, or into the uterine cavity if this has been opened, so as to reduce the thickness of tissue palpated. As I have said, fibroids as small as a mustard seed can easily be felt, on account of the apparent enlargement that the capsule produces. It may be argued that, even if all the fibroids be removed, there is nothing to prevent fresh ones being formed. The possibility cannot be denied, but in practice it does not occur, and my experience leads me to believe that as a rule the seeds of all the fibroids a woman is going to have are formed by the time she is 35 years of age.

Suture.

Not the least interesting part of myomectomy is that the suturing of the enucleation-cavities exercises the ingenuity of the surgeon. Where all the cavities are in the anterior wall the standard arrangement of mattress and superficial sutures, as for closing a Cæsarean incision, can usually be made to fulfil the purpose, though even here there are exceptions. When, however, a posterior tumour has been removed through an anterior incision the mattress suture may be inserted from the back of the uterus, guided by a finger passed into the cavity through the anterior incision. This is not quite so satisfactory as sutures passed anteriorly, because the suture holes lie, and the sutures are tied, on the back of the uterus. In cases where the cavity to be closed, though posterior, lies laterally, the sutures may be passed from before backwards outside the cavity of the uterus and tied on the side of the uterus, constricting the uterine artery with no disadvantage. When a posterior tumour has been removed "transcavity" the sutures can be passed from the uterine cavity, but in this case catgut should be used and not silk, as the knots will lie in the uterine cavity.

After the enucleation of a tumour which approaches the peritoneal surface the wall of the cavity left may be very thin at the pole where the tumour approached the peritoneum. In this event the thin wall should be invaginated by a circular purse-string suture or several rows of such sutures. A common position for fibroids to occupy is the fundus or the posterior wall just below the fundus, and they should be dealt with in the following way: A transverse incision is made in the anterior wall high up, opening or not opening the uterine cavity, as the operator thinks fit. A secondary track down to the fibroid is then made in the plane of the peritoneal surface of the fundus, and this having been enlarged by the finger, the tumour is enucleated. It will now be found possible to pull that part of the uterine wall that covered the tumour over the top of the uterus like a monk's hood and fix it by a series of mattress sutures so that the line of the incision now lies transversely across the anterior wall, much lower down than the original incision. All posterior fibroids cannot be got out through an anterior incision, and even with some capable of being so removed the posterior wall may be torn in the process, in which event the hole should be closed by a purse-string suture. Some posterior fibroids are too large or too closely blended with the peritoneum

to be enucleated from in front; in such cases the surgeon has no choice but to incise the posterior wall. It will then probably be necessary to reinforce or cover the suture line by one of the artifices presently described.

Redundant Tissue.

One of the greatest difficulties in myomectomy is the fact that with large submucous or interstitial tumours the uterus is so hypertrophied over the tumour that an immense organ is left after the tumour is removed; indeed, where the tumours are multiple, and this hypertrophy very marked, the case may be unsuitable for the operation altogether. The uterus involutes after the removal of a fibroid, as after labour, but to return to the abdomen an enormously bulky organ is to invite hæmorrhage or intestinal obstruction. In such cases, therefore, the excess of uterine tissue should be cut away, and I find that the tendency is not to do this boldly enough. The cut edges should be "bevelled" inwards to facilitate apposition in suturing.

I have spoken of the advantage of being able to fasten the wound in the uterus to the abdominal wall, and I often conclude the operation in that way, never myself having seen any serious ill-results from ventrofixation, but there are other things one can do to guard against post-operative oozing. Thus the round ligaments can be shortened so as very fully to antevert the uterus against the bladder, or the septum method of ventrosuspension, so popular in Liverpool, may be employed.

Occasionally one is obliged to prolong an anterior incision over the fundus and down the back wall, and in such cases I modify ventrofixation in this way. The front of the uterus is attached to the aponeurosis and peritoneum of the abdominal wall by silk sutures in the usual way; then above this area of fixation the parietal peritoneum alone is attached to that part of the uterine incision that extends down the posterior wall by a continuous catgut suture, the peritoneum being displaced from off the abdominal wall to allow of its coming down to the uterus. By this means I avoid the danger of posterior fixation, an operation which very rightly has been abandoned as dangerous. Incisions low down on the posterior wall cannot be so treated, but if laterally placed the ovary or the posterior part of the broad ligament can be swung inwards and sutured to cover them. If this cannot be done a very good plan is deliberately to attach the front of the pelvic colon to the line of the incision by catgut sutures, taking care that the bowel runs down to the rectum without a kink. A planned adhesion of the colon does not matter, but a chance adhesion of a coil of ileum is quite another matter.

Hæmorrhage.

Finally, in the matter of hæmorrhage during operation I nearly always begin by putting a ring forceps on the ovario-pelvic ligament on each side so as to control the ovarian vessels. If the operation is likely to prove a difficult one, or if there is great vascularity, I also temporarily clamp the uterine artery on both sides. This is conveniently done by passing one blade of the forceps through a hole in the mesosalpinx so as to avoid injuring the tube. In difficult cases, however, it is best to divide the round ligaments, turn back the peritoneum, and deliberately seek for and ligature the uterine vessels before beginning the enucleation; indeed, all four main vessels of the uterus may be safely ligatured without the slightest fear of gangrene.

These are the main points in the technique of the operation as I have performed it—no doubt many here have practised the same artifices and devised others which have not occurred to me. Myomectomy is essentially an operation which calls for ingenuity. Many of us, I know, have been unofficially (if I may use the term) extending the scope of myomectomy for some years past. The time is ripe for official recognition of that extended scope. There has been too much hysterectomy, and the public has come to believe that if a woman has a fibroid surgical opinion is in favour of doing what in vulgar parlance is called "taking all her inside out"; hence the retrograde revival of oöphorectomy for fibroids—"bloodless" oöphorectomy by X rays, but oöphorectomy just the same. I hope that in future it will be common knowledge that fibroids do not as a rule necessitate hysterectomy, and that if the possessors of fibroids will only submit themselves to early surgical treatment the womb need never be removed.

Introductory Lecture

ON

RADIOLOGY: ITS USE AND ABUSE.

Written for the Senior Medical Students of Sheffield University

BY REGINALD A. MORRELL, M.R.C.S. ENG., L.R.C.P. LOND.,

HON. RADIOLOGIST TO THE SHEFFIELD ROYAL HOSPITAL, CHESTERFIELD AND NORTH DERBYSHIRE ROYAL HOSPITAL, AND TO THE CITY OF SHEFFIELD KING EDWARD VII. HOSPITAL; JOINT CLINICAL LECTURER IN RADIOLOGY TO THE UNIVERSITY OF SHEFFIELD.

A LITTLE over a quarter of a century has passed since Rontgen announced his discovery to the world. In the interval which has elapsed a new art has been added to medicine, one which in its own sphere of usefulness is not likely to be superseded, for it empowers the practitioner to look beneath the surface and perform what has been aptly termed a living autopsy. When properly understood, the claims of radiology are modest, but in the past it has had greatness thrust upon it by those practitioners who credit the radiologist with almost magic powers. Like other institutions which have failed to fulfil popular but unreasonable expectations, radiology has sometimes been unfairly discredited. It has occurred to me that it will not be a waste of time to begin this course of lectures by a broad survey of the radiologist's powers and limitations. It is by realising both these aspects that you will be able to make proper use of radiology, summoning it to your aid more usefully and, perhaps, more often, than many practitioners to whom both X ray department and departmental teaching were closed books in their student days. To many practitioners the advantages of radiology are by no means apparent, for modern methods and modern apparatus are of very recent introduction—indeed, many provincial hospitals are not up to the standard of present-day requirements.

Up to fairly recent times the X ray department was the Cinderella of the special departments, and the medical officer-in-charge had no special position or training. He was regarded by his colleagues as a rather peculiar and not very useful photographer. He was forced to lead the existence of a mole in the subterranean passages of the hospitals; his privacy was sacred, and few people ever disturbed it. But even in those days we had poets amongst our number. One enthusiastic radiologist of foreign extraction began his atlas of the normal in these words: "The Rontgen tube shows herself soft and complacent only to him who can comprehend her language, who has watched her with constant and fastidious care in the silence and obscurity of his laboratory." There is something almost pathetic about the words "silence and obscurity." It is this very obscurity which has hindered the advancement of radiology in the past—the obscurity of ignorance—the ignorance of those who naturally neglect any subject not on their examination list. Radiology, like any other branch of medicine, will not flourish in isolated grandeur. To-day there is no necessity to insist upon the benefit of coöperation with our colleagues on the hospital staff. There is, however, real need for impressing upon the general practitioner that radiology is a consultative measure and the radiologist a consultant—that as such he is entitled to receive the fullest possible notes

on any case sent to him. These cannot be given in a hurried telephone conversation. A short note will be welcomed, or better still, any time that you may be able to spare him in actual consultation, although this latter, from reasons of time or space, is often impossible. In a hospital the X ray department of to-day is probably the most important of the special departments; yet in private practice an X ray examination is not called for with that frequency that it should be. To take one example only. The diagnosis of atonic dyspepsia has been abolished in hospital practice by examining the gastro-intestinal tract, and if the quantity of bismuth still given to some patients in private practice was given in one dose and at a single sitting, in the form of an opaque meal for X ray examination, the benefit to the patient would be considerably greater.

THE RADIOLOGIST OF TO-DAY.

The radiologist of to-day must be an electrical engineer who keeps himself up to date in the problems of high-tension electricity. He must watch with interest all attempts to solve the problem of the atom, since he himself is called upon to juggle with electrons, hurling them by means of ever-increasing potentials from cathode to anti-cathode. He must stand ever ready to grasp his especial opportunities of acting as liaison officer between the patient and the benefits which may result from X ray treatment based upon recent discoveries in bio-physics. On the other hand, he is called upon to converse as intelligently as possible with all his medical colleagues. He is asked to counsel the surgeon and help the physician; to converse with the skin specialist, and meet the pathologist with some understanding of a differential blood-count, and a considerable acquaintance with the pathology of tumours. Finally, he is supposed to have an almost universal acquaintance with the normal, including those bugbears of our anatomy days, the dates of appearance and fusion of the epiphyses.

This little picture of the ideal radiologist is presented to you with a definite purpose. It is meant to emphasise the fact that whereas a V.A.D. can be trained to take X rays, it requires a specially trained medical man to interpret the results, to supervise the technique, and to carry out all examinations of importance, especially those connected with function. Anyone so trained has a right to the treatment given to any other consultant, and not that which he sometimes gets—viz., a curt request for an "X ray of the jaw"—a request which might be considered sufficient if you were addressing a photographer, but does not answer a single one of the queries which arise in the radiologist's mind. In such cases you will be lucky if you do not find yourself thrown on your own resources by a subsequent report, "Please see plate." It is not only the duty of the radiologist to demonstrate certain abnormalities, but also to help in their interpretation; to enable him to do this properly he must be supplied with adequate notes. The importance of this is twofold. Lack of essential details may lead to improper technique or failure to pay attention to certain fleeting phenomena. The definite request for particular information implied, if not directly asked for, in the notes accompanying a patient, has a definite psychological effect on the radiologist. Much of the radiologist's work consists in making comparisons between the normal and the abnormal. In the language of psychology, he is definitely on the look-out for a similarity or a difference in a known particular—the known particular in this case being the normal. The act of comparison is facilitated by his attention being definitely drawn to certain queries, since *attention* increases the intensity of a sensation; in this case the sensation is, of course, the visual sensation. *Attention* also secures an increased persistence of sensation—i.e., it rapidly increases the radiologist's experience and enables him to recall his experiences with benefit to his subsequent patients. It is an elementary fact that so long as we view a particular object or a particular function alone, we merely *apprehend* that object or function. This is the position of the radiologist who is not supplied with adequate notes. It is only when we bring the fact apprehended into relation with other data that we *comprehend* it. Comprehension is the proper function of both the radiologist and the practitioner, and the solutions arrived at by each of them may be the same or different. In the first event the diagnosis is strengthened; in the second a still more careful final examination of all the available data will be requisite. In either event, the patient stands to benefit by the careful thought which has been imposed on her medical attendant. The radiologist supplies a group of facts on the one hand, or a set of inferences on the other. His facts may be positive or negative—i.e., he may prove the presence or the absence of a certain condition—whilst the former is the more satisfying, the value of negative facts must not be lost sight of, since they set your mind free to concentrate on the alternative diagnosis. The inferences supplied by the radiologist should not be lightly dismissed, nor are they to be accepted until their value has been proved by the practitioner for whom they are made. Such proof is simple, since it consists in the attempt to fit the inferences into that jig-saw puzzle which we call diagnosis. The particular puzzle may seem complete without the little piece supplied by the radiologist, and if this is simply an inference, it may be discarded. If, on the other hand, it consists of a definite observation of an irrefutable fact, positive or negative, then the apparently satisfactory solution of the puzzle must be disregarded and the pieces rearranged.

Indirect radiological evidence—evidence made up of inferences based upon observed facts—must always be received with caution, for its value depends on so many uncertain factors, not least amongst which is the individuality of the observer. Even the best of radiologists may sometimes be led astray from the paths of cunning deduction into the fields of bold speculation. Such evidence, then, should be accepted only so far as it confirms the data obtained by other methods of examination. The final verdict lies, not with the radiologist, but with the practitioner, and if the latter has neglected his part in collecting data, if, that is, he has been relying on a mistaken conception of what radiology can accomplish in certain cases, he will find his patient poorer and his own position advanced no whit. Radiology, when properly used, is of great benefit; improperly used, it is a weapon with a blunted point. All diagnosis being a statement of a strong probability, any method of examination which will make this more certain has its own proper sphere.

The report from the radiologist is best rendered in two parts:—

1. The facts observed. (Description in writing and registration on a plate or film.)
2. The inferences which he draws from such facts.

The first part is to be accepted; the second part is to be cautiously weighed. The value of both will be enhanced by real coöperation and consultation between the radiologist and the practitioner. The former is engaged in a kind of analysis, the latter on a process of synthesis, and the efforts of both are complementary.

DIAGNOSIS OF FORM AND DIAGNOSIS OF FUNCTION.

It is not fair to expect the radiologist to give positive facts in every case, and so to relieve you of any task except that of prescribing for your patient and basking in the kudos which will naturally result. There are many cases where this desirable condition of affairs will result from a radiological examination, but to restrict radiology to such regions would be to limit its usefulness very considerably. As often as not the radiologist is handicapped by the fact that he can only render a static impression of "form" on a flat film. "Function" can only be examined by screening, and then only in such areas as the thoracic cavity and the gastro-intestinal tract. It is in the examination of function that inference plays such a large part.

If this distinction between the diagnosis of "form" and "function" be kept in mind, the benefits of radiology become clearly defined, and will be correctly called for, with the result that this valuable diagnostic measure will not run the risk of being discredited by failure to respond to impossible demands.

DIAGNOSIS OF FORM (POSITIVE AND NEGATIVE FACTS).

Whilst there is no portion of the body where an X ray examination does not reveal a number of facts, as opposed to inferences, it is particularly in the examination of the various bones, joints, and accessory sinuses for disease and injury that we obtain results which enable us to diagnose, not only the extent of the abnormal process, but also its ætiology. In this connexion radiology approaches its nearest to being an exact science. For the present I shall content myself with drawing your attention to certain broad principles in radiology. It is unwise to treat even apparently trivial injuries without recourse to an X ray examination. A simple sprain may in reality prove to be a far from simple fracture; and weeks may be lost, and disaster result, from neglect of this simple precaution. The symptoms of a major injury may mask a minor injury which, if discovered, would alter both your prognosis and method of treatment. As an example, remember the comparative rarity with which fractures of the ulnar styloid and scaphoid bones were diagnosed before X ray examinations become a matter of routine. A dislocation, the reduction of which has filled you with satisfaction, may be accompanied by an undiagnosed fracture, and this is calculated to upset all your equanimity when discovered much later on.

There are some fractures in which the X ray is the only certain method of diagnosis. Certainly in connexion with suspected bone injury or disease, it is better to have recourse to an X ray examination as a routine, especially in view of the fact that legal action may be taken as a result of such neglect, and that the courts have awarded damages in such cases. So far as disease of the bones or joints is concerned, the varying shadows cast by different pathological processes are, for the most part, characteristic, and are comparable either in form or position with the known facts of surgical pathology. It is a peculiar feature of X ray diagnosis that surgical facts are more easily demonstrated by this means than are those of medicine. We shall see this emphasised when we are dealing with the collection of inferences.

Prognosis by X Ray Examination.

There is one more principle that I wish to emphasise in connexion with X ray examinations, not only in relation to bone work, but also in other conditions, especially in the thoracic cavity—viz., the value of repeating such examinations. It is quite usual to be requested to make an examination for the purpose of diagnosis, but it is comparatively rarely, outside of hospital practice, that we are asked to repeat the examination, and to report progress. Yet this is a valuable check on the formation of callus in fracture, or the progress of such conditions as caries or osteomyelitis. I have no doubt that as the result of neglecting this simple precaution, many cases are kept immobilised for much longer than is necessary, and possibly others are allowed to bear weight on the lower extremity before it is advisable. You may reply that the patient or her relations are inclined to object to the expense. But surely this is only a question of tact. They are unlikely to put any objections in your way if they are made to appreciate the fact that this is the best way, not only for you, but also for them, to watch the progress made. This serves to calm their impatience, and also increases their confidence in you, and especially if you are practising a masterly inactivity.

In every situation the X rays can give positive information, and the region of the chest is no exception to this rule. An early aneurysm may be diagnosed by this means long before any definite and unmistakable symptoms have been found. From the appearance of cast shadows we can diagnose the presence of pleurisy with effusion and dry pleurisy. In the case of the former we can judge with ease the extent of the process and see the degree of displacement of the heart, so arriving at a conclusion as to the advisability of aspirating the pleural cavity. Empyema, abscess of the lung, pneumo-thorax, and pericarditis are all easily distinguishable, since in most cases they give absolutely characteristic pictures on screening. In the case of the former, we get valuable indications as to the site of operation.

Inferences.

Yet there are some cases where, in spite of the accessibility of this region to radiology, the results can only be supplementary to an accurately conducted physical examination. To ignore the value of radiology in these conditions, and to reserve it for those cases where only an exact diagnosis may be expected, would be to restrict unduly a very valuable diagnostic measure. It is an ironical fact that, in the very position which is most accessible to an X ray examination, we are confronted for the most part with a series of inscrutable shadows which occur in the same position, and which, whatever their ætiology, leave similar black and white shadows on the film. Broadly speaking, the practice of drawing conclusions as to the ætiology of shadows in the lung is a dangerous one. There are exceptions to this rule. Some of these exceptions we have already noted; others we shall deal with in greater detail when we consider at length the whole question of radiology in this region. In no disease, however, is this difficulty brought home to us with greater force than in that of *phthisis*. In this disease a radiological examination is less helpful in deciding that the disease exists than it is in giving us a valuable picture as to the extent of the process. By means of the X ray it may be demonstrated that the disease is far more extensive than the physical signs denote. The examination will not tell us how much of the process is tuberculous and how much is due to the attendant broncho-pneumonia. Neither will it differentiate with any certainty between active and non-active disease. All the evidence that we get is that of a cast shadow with few characteristic forms or degrees of opacity that we can definitely label as due to some certain ætiology, unless we make an exception in the case of cavity formation. There is, for example, little to differentiate between the shadows cast by miliary tubercle and those of miliary carcinoma. Hilus enlargement may be due to tubercle, syphilis, or malignancy. A pleural effusion, which does throw a characteristic shadow, may mask an underlying malignant growth. Yet with all these objections there remains much of value in the examination of the chest by X rays. Although we are confronted with the fact that a radiological examination cannot be relied upon to give a positive diagnosis, yet it may prove that what is clinically an early case of phthisis is really much more advanced and extensive than supposed. Again, there may be grave suspicion that tubercle of the lung exists, although the stethoscope fails to give supporting evidence. Here the X ray picture may be the deciding factor, and is often confirmatory and helpful in showing the extent and situation of the disease. The very fact that the eye can by this means penetrate into hidden recesses and can distinguish abnormalities of shadow, situated at such a depth that they are beyond the reach of percussion or auscultation, constitutes a very great boon. In the thoracic cavity, as in other situations, the X ray analysis provides data which, when added to the other information in the possession of the physician, enables him to coördinate his findings and so arrive at a diagnosis. Repeated examinations are also of the greatest use in watching a case once diagnosed and forming a reliable prognosis.

DIAGNOSIS OF FUNCTION.

My final remarks are on the subject of the diagnosis of function. In no situation is this required to a greater extent than in study of the gastro-intestinal tract.

Our positive facts are few. We can demonstrate an obstruction wherever situated, but often we can only guess at its ætiology. We can give you a positive demonstration as to the extent of an intrinsic gastric carcinoma. We can give you a positive demonstration of the loss of tone in the stomach, and the displacement of this organ or of the large intestine. We can readily demonstrate and distinguish between the two forms of constipation—an important matter to which too little attention is paid. The rest is for the most part inference from various findings. The value of such evidence is directly proportional to, and depends upon, your own skill in examination, being greatest when you are really consulting with the radiologist, and not merely handing your patient over in the hope that something definite may be seen. Helpful information can be obtained in suspected cases of gastric and duodenal ulcer, and even in chronic appendicitis.

The diagnosis of chronic affections of the gall-bladder has been put upon an entirely new footing by the work of George and Leonard in America. We are no longer limited to an attempt to demonstrate the presence of gall-stones. By the use of the opaque meal we can demonstrate deformities and abnormal function in the duodenum which give important clues, and which, when taken in conjunction with other data, may clinch the diagnosis of pathological gall-bladder.

CONCLUSION.

By the use of X rays we diagnose abnormality in form or function. The former we can generally state as a fact; the latter is largely a matter of inference. As a result of evidence so obtained, one or other of the following advantages accrue: (1) Confirmation of a diagnosis; (2) determination of the extent of a disease; (3) prognosis is helped by subsequent examinations; (4) a differential diagnosis may be established; (5) an erroneous diagnosis may be corrected.

Radiology is a consultative measure, and its success is largely dependent upon, and directly proportional to, the care and skill with which the general practitioner collects his data and places them at the disposal of the radiologist. A proper X ray examination can only be carried out if there is the same relationship with the radiologist as exists between the general practitioner and any other consultant.

THE ACTION OF VACCINES.

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THE prophylactic inoculation of vaccine as a means of protection against various bacterial diseases has been widely adopted and practised in all parts of the world. The employment of vaccine for the treatment of bacterial infections, while commonly followed in the case of chronic infections, is, however, held by many authorities to be absolutely contra-indicated in acute infections. The argument is usually advanced that to inoculate a bacterial vaccine into a patient already suffering from the effects of bacterial intoxication is quite illogical. On the other hand, excellent results have been claimed [1] in the treatment of acute infections where small doses of vaccine have been used, the results of vaccine treatment carried out on these lines being definite and unmistakable. For many years I have employed minute doses of vaccine with success, more especially in the treatment of acute respiratory infections. The clinical results obtained in a large number of cases have been so uniformly good as to leave no doubt as to the value of this procedure. It is realised, however, that, in order to secure a more general application of vaccine treatment in acute infections, it is necessary to make an attempt to explain the mode of action of vaccine in these cases. The present state of knowledge does not appear to provide the known facts necessary to permit anything in the nature of dogma. It is felt, however, that it is better to attempt to place on record views largely theoretical, but in agreement with clinical experience, rather than leave the matter in its present chaotic and confusing condition. The views expressed in this paper have been formulated as a result of some 12 years' continuous practical experience in the preparation and employment of vaccines for the treatment and prevention of various diseases.

The increasing interest in new methods of investigation and treatment of such diseases as asthma, urticaria, &c., by means of various food and bacterial proteins has prepared the way for the reception and understanding of analogous principles applied to the employment of vaccines in bacterial infections. Furthermore, the more general appreciation of the fact that anaphylactic phenomena directly follow under certain conditions the administration of proteins, emphasises the necessity of a general revision of our somewhat narrow present-day attitude, and of our conception of what takes place when vaccines, which consist chiefly of bacterial proteins, are introduced into the body.

Action of Vaccines.

In discussing the action of vaccines, it seems advisable clearly to differentiate the known facts from the groundwork of theory, in which these facts are represented, in order that we may formulate a practical working hypothesis. It has, so far, proved impossible to provide a complete chain of evidence as to what actually takes place when a foreign protein is introduced into the body. When, however, definite practical results are obtained over a number of years in a large number of cases, and cannot be explained by the generally accepted views as to the mode of action of vaccines, some adjustment of theories is imperative.

From considerations of space, I propose to confine my remarks as much as possible to the actual subject under discussion, although it is difficult entirely to ignore cognate problems.

Résumé of Present-day Views.

In order to make it clear to what extent, and in what regard my views differ from those generally accepted, I propose to attempt a short résumé of the views held by the majority of workers employing vaccines in their practice.

A vaccine consists of the suspension of the solid bodies of bacteria in an inert fluid. In view of the introduction of new preparations, it is necessary to state that the term "vaccine" is also employed for preparations derived from bacteria which have been completely broken down by strong chemical solutions and sometimes, in addition, by mechanical means. In this instance, the "vaccine" consists not of a suspension of actual bacteria, but rather of a suspension and partial solution of bacterial protein derivatives. Although such "vaccines" do not contain actual bacteria, nevertheless the dosage of these preparations in terms of a numerical expression is still retained. The rationale of vaccine therapy may be thus briefly indicated: Specific antibodies—e.g., agglutinins, opsonins, lysins, antitoxins, &c.—are produced in the blood either as the result of an actual bacterial infection, or as the result of the inoculations of a killed culture of a bacterium (vaccine). These antibodies may act independently or in conjunction with phagocytic cells, and thus the infecting organism is overcome and its toxic effects neutralised. This normal process of cure may be delayed or prevented, either owing to lack of response on the part of the tissues, or to a local deficiency of antibodies, as, for example, in acne lesions where the infected focus is deprived of an adequate blood-supply by a reactionary fibrosis. Vaccines are, therefore, employed to increase the individual's resistance to infection by means of the elaboration of various antibodies.

The use of these immunising agents has a wide application. Generally speaking, vaccines are employed in any disease in which it is possible to isolate and cultivate the causative organisms. The dominant idea in regard to the action of vaccines is that an excess of protective substances is produced in the blood as a result of vaccine injection, which

actually destroy the bacteria, chiefly by dissolving them (lysis) either in the tissue fluids, or after ingestion into leucocytes. The known facts included in the above working hypothesis have been established as a result of the laborious researches of numerous brilliant workers, including Metchnikoff (who established, after a hard fight, the importance of the leucocyte in defence against bacterial invasion), Ehrlich, Behring, Pirquet, Pfeiffer, Bordet, Besredka, and Wright.

It should be remembered that the main facts briefly indicated above are supported by a very large number of experiments carefully carried out and confirmed by large numbers of workers. In order to link up these known facts, workers on immunity problems have been compelled to draw, to a considerable extent, on the imagination in order to supply the missing links in the incomplete chain of evidence. It is my purpose to indicate that the general present-day view fails to explain the practical results obtained in vaccine therapy, more especially when the treatment of acute infections with minute doses of vaccine is considered.

Before discussion of the action of vaccine in the different circumstances in which it is employed in practice, I propose to refer briefly to the points of contact of vaccine therapy with the extremely interesting and important subject first described by Richet [2] as anaphylaxis or hypersensitiveness. I have long appreciated the importance of anaphylactic phenomena in vaccine therapy [3]; and with regard to them, it is first necessary to point out that a great deal of loose thinking and loose terminology is extant to-day. The conception generally encountered in discussion with medical men is that when the term anaphylaxis is used fatal anaphylactic shock is implied. This leads to much confusion in thought and argument. It is important to emphasise the fact that anaphylactic phenomena may be purely local, and may produce no symptoms further than a slightly tender reddened area at the site of inoculation. Fatal anaphylactic shock may for practical purposes be considered as non-existent in vaccine therapy. Severe general effects, represented by profound depression and an increase in severity of symptoms already present, certainly follow the employment of large doses of vaccine in acute infections, due to a condition of hypersensitiveness present in acute infections, yet the occurrence of the classical anaphylactic shock, such as may follow serum injections, may be definitely ruled out in vaccine therapy. As a general rule, the dosage recommended in acute infections by the majority of writers on this subject is, from my experience, too large; the objections to the employment of vaccine in acute infections are definitely due to this frequent over-dosage. The early experience in the employment of tuberculin in large doses, for the treatment of pulmonary tuberculosis, is paralleled by that of the employment of bacterial vaccines for the treatment of acute infections. The present tendency to increase the dosage of vaccines constitutes a real danger in acute infections.

Anaphylaxis in Vaccine Therapy.

It has been the custom to look upon the action of vaccines in various diseases as purely a question of the production of various antibodies, such as agglutinins, opsonins, &c. It is known, however, that these bodies are not experimentally demonstrable in the blood, except after a certain interval (from five to seven days) after inoculation; whereas it is common knowledge that marked changes, such as a fall of temperature and pulse, rigor, &c., may occur in acute infections within from 6 to 12 hours after an injection of vaccine. This strikingly rapid change can have nothing to do with the development of agglutinins, opsonins, &c.; these phenomena call for a different interpretation. An individual suffering from an acute infection becomes markedly sensitive to the smallest dose of vaccine prepared from the causative micro-organisms, whereas the inoculation of doses of the same vaccine hundreds of times larger has little or no effect on a healthy individual, or on the same individual when completely recovered from the disease. This sensitiveness to vaccine appears to be definitely due to the development of anaphylaxis to the bacterial protein contained in the vaccine. I propose to describe the observed phenomena under the following headings:—

(*a*) *Local Anaphylactic Reaction.*—The local inflammatory reaction, such as redness, tenderness, and swelling at the site of inoculation within 24 hours, is of the greatest service, especially in acute infections, as ocular demonstration of the specificity of the vaccine used, and as a guide to the size and interval of the next dose of vaccine. In chronic infections, the question of dose and spacing is not by any means so vital a matter as in acute infections, because the patient is not so "anaphylactic" in chronic diseases, and consequently the margin of safe and effective procedure in dosage is wide.

(*b*) *General Anaphylactic Reaction* (*Changes in Temperature and Pulse, and General Improvement following Inoculation*).—The rapid change in the physical signs in a case of acute bronchitis following successful therapeutic inoculation occurring frequently within 24 hours has no relation to agglutinins, opsonins, &c., but is due to anti-anaphylactic action. The subject is somewhat complex, but it seems highly probable that these almost immediate changes are closely analogous to the anti-anaphylactic action demonstrated by Besredka,[4] who has shown that a condition of hypersensitiveness or anaphylaxis to horse serum can be neutralised by the preliminary injection of a small dose, shortly after which a large dose can be safely administered. Without this preliminary injection, the larger dose of serum on injection produces serious and even fatal results.[5]

Anaphylaxis in Respiratory Infections.

In no group of diseases are anaphylactic phenomena more evident and important than in infections of the respiratory tract. An injection of a mixed vaccine prepared from the common causative organisms of moderate strength, such as is commonly used for prophylactic inoculation against respiratory catarrhs when inoculated into an individual free from catarrh, produces very little local reaction, and practically no general reaction. If the same dose, however, be inoculated in the same individual in the presence of an acute respiratory cold or catarrh, the local and general reaction is greatly increased, out of all proportion to the amount of vaccine used, and the resulting effects may be so severe as to confine the patient to bed for a week. Some change must have taken place in the patient to produce such different results in the two circumstances indicated. This change is due to the development of anaphylaxis, produced by the activities of the causative bacteria present in the acute attack. The phenomenon is so constant that it is possible to diagnose the presence or absence of respiratory catarrh without observing physical signs by merely noting the results of the inoculation of a suitable dose of mixed vaccine, prepared from the organisms commonly found in respiratory infections (anaphylactic test).

I. *Prophylactic Action of Vaccine against Bacterial Invasion.*

In order to simplify matters, I propose only to deal with the prophylactic inoculation of killed cultures of micro-organisms grown on various media, and to consider, first of all, the action of prophylactic vaccine under the simplest circumstances:—

1. *Subjects in Normal Health.*—Where the subject is in normal good health, and does not harbour the causative micro-organisms of the disease against which protection is to be established:—

(*a*) *Subcutaneous Inoculation.*—In this instance, prophylactic inoculation consists of the injection of two or more doses of a saline suspension of a killed culture of the responsible micro-organism. The bacterial vaccine acts simply as an antigen, and calls up an immunity response which consists of an over-production of antibodies such as bacteriolysins, opsonins, agglutinins, complement-deviating bodies,

&c. A polymorphonuclear leucocytosis is also commonly produced. Prophylactic inoculation of this type is largely practised in the case of typhoid and paratyphoid fevers, plague, and cholera. Although these changes in the blood take place in the great majority of cases, in a small proportion little or no response to inoculation may occur in the production of antibodies. These cases may possibly account for some of the failures of prophylactic inoculation.

Experiments recently carried out at the Lister Institute [6] indicate, moreover, that where the infecting micro-organism is of high virulence, the presence of a high titre of antibodies in the blood does not necessarily indicate the presence of an established immunity. I was able to confirm Tenbroeck's observations,[7] however, that a satisfactory immunity may be produced against an organism of high virulence by immunisation with a *living* vaccine prepared from a related organism, avirulent for the species. In this instance, agglutinins for the virulent organism were either not present at all, or only feebly represented (1 in 80) in the blood. Killed vaccines prepared either from the homologous or from a related organism failed to give solid immunity against the live virulent strain, in spite of the fact that a satisfactory antibody response was obtained.[8] It would therefore appear necessary, when discussing prophylactic inoculation, to adopt a cautious attitude where the causative organism develops an unusually high degree of virulence, owing to special local circumstances, as, for example, in the presence of a severe epidemic. It also follows that the antibody titre cannot invariably be accepted as evidence of established immunity in an inoculated subject.[9]

(*b*) *Oral Administration of Prophylactic Vaccine.*—The interesting experiments of Besredka, in which he showed that rabbits could be immunised against intestinal infections, such as typhoid, paratyphoid, and dysentery, by feeding them with cultures of these organisms, after a preliminary treatment with bile, suggest the possibility of producing an immunity localised to the actual cells of the intestinal mucosa. These experiments further indicate the absence of correlation between established immunity and the titre of antibodies in the blood, complete protection being demonstrated in rabbits whose blood showed either no agglutinins or agglutinin in low titre. These experiments have been put to a practical test in a recent outbreak of typhoid in the Pas-de-Calais, where vaccine was administered to some 1200 individuals in pill form, and the results compared with a control group in which ordinary prophylactic inoculation was carried out by the subcutaneous route. Encouraging results followed, which pointed to an increased efficiency of the Besredka oral method.

This work appears to lend support to those who insist on the importance of cellular immunity, originally strongly advocated by Metchnikoff.[10]

2. *Subjects Recovered from Acute Attack.*—The most important example of prophylactic inoculation of individuals recovered from an acute attack, but still harbouring the causative micro-organisms, is afforded by a consideration of acute infections of the respiratory tract (e.g., common colds, influenza, &c.). Prophylactic inoculation in these cases is much more complex and more difficult to carry out in practice, owing to the fact that the patient may not be in normal health, but is still suffering from the disease in a latent form. Prophylactic inoculation is sought with the object of preventing a relapse, and to obtain some relief from the chronic susceptibility to respiratory infections. During the course of an acute infection, such a patient is highly sensitive to a vaccine prepared from the causative micro-organisms; this sensitiveness becomes gradually lessened in the majority of cases as the acute symptoms subside, but it interferes materially with the employment of doses sufficiently large to call up a protective immunity response. As it is not possible to know in any particular case to what extent the patient may still be sensitive to the vaccine, it is wise to give a small or moderate initial dose, and to give several inoculations until the necessary amount of vaccine has been administered to ensure a protective immunity response. It is noteworthy that, in these cases, the good effects produced by prophylactic inoculation vary considerably in different individuals, and in any case, probably owing to the frequency with which subjects are exposed to mass infections, complete protection is of a comparatively temporary nature, frequently lasting not more than six months.

In prophylactic inoculation of this type there come under consideration two separate and definite factors, which will be more fully dealt with in the succeeding section. In addition to the production of antibodies, there is also the question of hypersensitiveness, or anaphylaxis resulting from a recent acute infection. The procedure consists of a preliminary desensitisation by comparatively small doses (the size of these doses generally depending on the interval which has elapsed since the acute symptoms have subsided), which is followed by doses of vaccine sufficiently large to ensure a satisfactory antibody response. A failure to recognise the presence of hypersensitiveness or anaphylaxis to the causative micro-organisms in individuals recently recovered from an acute attack has led to the production of severe reactions in individuals treated with large prophylactic doses of vaccine. Erroneous views have been put forward in explanation of the toxicity of vaccines in these cases. These severe reactions have been stated to be due to some peculiar property, or unusual toxicity of the vaccine itself, rather than to a change in the susceptibility of the patient to vaccine, and new drastic methods of preparing vaccines have been introduced with the idea of reducing the local reaction and the so-called toxicity of the vaccine.[11]

The new methods consist of the breaking up of the bacterial bodies by strong chemical solutions aided by mechanical appliances and employing a suspension of the residue as a vaccine.[12] The actual effect of this procedure is to weaken enormously the antigenic value of the vaccine, the titre of which is probably at least a hundred times less than the titre of the original bacterial suspension. The good results sometimes claimed with large doses of such treated vaccines in acute infections provides clinical evidence that the method of preparation has resulted in a very marked weakening of the antigenic value of the vaccine, the results obtained being closely similar to results which would follow the exhibition of minute doses of an untreated ordinary vaccine.

II. *Therapeutic Action of Vaccine in Bacterial Infections.*

The action of vaccines employed therapeutically in bacterial infections may be considered (1) in chronic infections, and (2) in acute infections, local and general.

(1) *Chronic Infections.*—Here there is definite limitation of the area of infection to the pathological lesion, as, for example, in furunculosis. Probably owing to the comparatively small area of tissue affected and the low toxicity of the bacterial poisons generated, the pathological effects are strictly localised, and any hypersensitiveness of the tissues to the causative micro-organisms which may be produced is of a very low degree. The action of vaccine in these cases is comparatively simple, the injection of the antigen or vaccine merely giving rise to over-production of antibodies, and a varying degree of leucocytosis. In view of the possibility of some slight degree of hypersensitiveness to the bacterial antigen having been produced by the infection, it is wise to begin treatment with doses on the small side. The exhibition of large initial doses so depresses the defensive mechanism as to lead to an increase of the symptoms.

(2) (*a*) *Acute Local Infections.*—These infections, such as acute tonsillitis, produce their pathological effects as a result of the absorption of highly toxic bacterial products, the causative micro-organisms remaining localised at the site of infection, and no invasion of the blood stream taking place. The administration of a minute dose of vaccine (e.g., in the case of a strepto-

coccal infection, a dose of 10 millions untreated vaccine) produces definite effects, such as the development of a small local reaction at the site of puncture, about 24 hours after inoculation, a fall of temperature, and possibly sweating, and even a rigor within from six to eight hours after inoculation. The inoculation of such a minute dose of streptococcus vaccine in a healthy subject produces no local or general effects. Therefore the presence of an acute local streptococcal infection has clearly changed the action of the patient's tissues to the bacterial antigen, by establishment of an anaphylactic condition, or hypersensitiveness. The presence of hypersensitiveness is further demonstrated by the fact that subsequent injections of the same dose of vaccine produce less and less effects until no effect is produced. These results indicate that the condition of hypersensitiveness in the acute stages gradually wears off until it may completely disappear, and that the doses employed have desensitised the patient to the bacterial antigen. In practice, therefore, it is customary gradually to increase the dose at short intervals (24–48 hours), and later at longer intervals, when larger doses are employed (four to seven days).

The nature of the desensitising process must be left largely to theoretical conjecture; my object, however, is not to elaborate theories but to record clinical facts, and to point out certain definite practical results which have been obtained. In my opinion the action of vaccine in this case has nothing to do with the development of agglutinins, opsonins, bacteriolysins, &c.; it is a simple matter to exclude these factors, for the dose (which it is convenient to call a desensitising dose) is too small to produce demonstrable antibodies in the blood. Moreover, definite effects occur within from six to eight hours, a period far too short for the elaboration of antibodies which do not appear in the blood until a period of from five to seven days after inoculation of a considerably larger dose of vaccine. The therapeutic value of the employment of minute doses of vaccine in these cases has been repeatedly proved in a large number of cases.

As the dose of vaccine is increased and a sufficient interval has elapsed the production of antibodies assumes increasing importance, thereby increasing the protective mechanism of the body to guard against a re-lighting up of the infection, or a relapse. It is generally assumed to be illogical to inject vaccine consisting of bacterial protein into a patient who is already suffering from the harmful effects of bacterial invasion, colourable support being given to this assumption by the well-known harmful effects of the employment of vaccine in these cases, except in minute doses. These harmful effects cannot be too strongly insisted upon, owing to the anaphylactic condition which is set up as a direct result of acute bacterial infection. When it is realised, however, that the employment of a minute dose of vaccine is in the nature of a desensitising dose, it will be seen that the action of vaccine in these cases is of an entirely different nature, and does not rely for its good effects on the question of antibody response.

It is necessary to refer briefly to Besredka's valuable work "Anaphylaxie et Antianaphylaxie,"[14] which supplies a strongly suggestive hypothesis as to the real nature of the action of minute doses of vaccine in acute infections. Besredka has shown that anaphylactic shock can be prevented in an animal who is hypersensitive to a given antigen by the preliminary administration of a minute dose of the antigen, which he calls the anti-anaphylactic dose. This minute dose is given either intravenously or subcutaneously. It is then found that a large and otherwise fatal dose of antigen may be safely administered to the animal some 15 minutes later in the case of an intravenous inoculation, or some four hours later in the case of subcutaneous injection. Without the anti-anaphylactic dose, the administration of this dose of antigen would certainly produce a fatal anaphylactic shock. There appears to be strong grounds for assuming that the small desensitising dose of vaccine above referred to behaves in the manner of an anti-anaphylactic injection.[1]

To what extent the phenomena of anaphylaxis obtain as important factors in more chronic infections can be settled in each case by means of a cautious employment of a small dose of vaccine as a trial or anaphylactic test dose. Danysz has put forward an interesting theory of immunity anaphylaxis and anti-anaphylaxis with special reference to chronic diseases such as urticaria, eczema, asthma,[13] &c. Danysz describes bacterial vaccine therapy as dependent upon anti-anaphylaxis for its success. He states that "the bacterial vaccine is an antigen and acts by neutralising the antibody in the patient's system. In acute infectious disorders the appearance of the symptoms actually coincides with that of the excess of antibodies and the injection of a suitable dose of the infecting microbes, sterilised or attenuated, results in neutralising the excess of antibody. At the same time, the symptoms of the disease disappear."

Although it is necessary to draw largely on the imagination for suitable theories, it is important that hypothetical considerations should not conflict with facts. One difficulty is to know what takes place in the body during the incubation period of the disease, that is, when the patient is in normal health and suffering from no definite symptoms. In typhoid there is an incubation period of roughly 12 days and it seems extremely unlikely that the gradual establishment of *B. typhosus* which culminates in an actual attack of enteric is without action on the body during the incubation period. Demonstrable antibodies are not, however, found in the blood until the end of the first week of the disease, or some 18 days after infection. Under these circumstances, it seems difficult to entertain Danysz's view, quoted above, that the appearance of symptoms actually coincide with that of the excess of antibodies. Moreover, in some of the most severe cases, which sometimes end fatally, the agglutination test remains negative throughout, although the actual fact of infection is proved by the isolation of *B. typhosus* from the body. The change in the body during the periods of incubation and acute infection seems more complex than a simple antibody response, but it is not yet possible to define this change precisely. The fact that hypersensitiveness results directly from infection suggests some association between anaphylactic phenomena and bacterial invasion.

Mention must here be briefly made of the closely associated cognate problem of protein therapy as applied to the investigation and treatment of such diseases as asthma, urticaria, &c. In the publications of Chandler Walker,[14] Coke,[15] Freeman,[16] and Auld [17] are detailed descriptions of investigation and treatment of these conditions. Briefly, the method consists of testing, by means of a skin reaction, the sensitiveness of the patient's tissues to a large number of proteins prepared from various foodstuffs, pollens, and bacteria. Some examples of sensitiveness are remarkable. Chandler Walker describes one case sensitive to cat-hair protein, from which a positive skin test was obtained with cat-hair protein in a dilution of one in a million.

> "Two minims of cat-hair protein in a dilution of one in a million were injected in this patient subcutaneously, without any trouble, but when two minims of this protein, in a dilution of one in a hundred thousand were injected, a severe attack of asthma began two hours later. It is interesting that this attack of asthma should continue for a week following one exposure to the antigen. After a few doses of the protein in a dilution of one in a million, however, the patient was sufficiently desensitised to withstand a dilution of one in one hundred thousand, which had previously caused severe asthma."

During treatment, the positiveness of the cutaneous reaction decreased one hundredfold.

I have little doubt that the action of minute doses of vaccine employed in acute infections as desensitising or anti-anaphylactic doses is an action of the same nature, and depends upon the same principles as the employment of small doses of weak dilutions of protein for the treatment of protein hypersensitiveness in asthmatics, &c.

(2) (*b*) *Acute General Infections.*—By these are meant infections which involve invasion by the micro-organism of the blood-stream. The objections raised by some writers to employment of vaccine in acute local infections are more strongly urged in acute general infections (septicæmia). The invasion of the blood-stream indicates that the barriers normally set up as a defence against the micro-organism have been broken down either owing to the patient's feeble defensive mechanism, or—what amounts to the same thing—to the presence of a highly virulent organism. The harmful effects of the infection are, to a considerable extent, due to the actual elaboration of bacterial poisons, and their absorption by the tissues. Although the ultimate result—death or cure—resolves itself into a struggle between the host and the parasite, in practice good results actually follow the administration of minute doses of vaccine in both acute local and acute general infections without differentiation. Minute doses of vaccine may be held to act as a shield against the toxic effect of the bacterial poisons. I therefore advocate their employment in cases of acute general infection.

In order to express in practical terms the views given in this paper, I have drawn up a table which suggests a suitable initial desensitising or anti-anaphylactic dose for many of the more common organisms. These doses apply only to vaccines prepared in accordance with the original methods, and not subjected to the action of strong chemical solutions. It should be realised, however, that the initial dose employed in the treatment of acute infections is always of the nature of a trial dose. The employment of larger initial doses than those advocated in the table introduces the possibility of unduly severe reactions, and may actually do harm by increasing the bacterial toxins already present in the body. The harmful effects of large doses of vaccine in acute infections cannot be too strongly emphasised. Only by strictly limiting the dose, so that the vaccine employed acts as a desensitising dose, can good results follow the employment of vaccine in acute infections.

The Local Reaction in Acute Infections.

The character of the local reaction following the inoculation of vaccine is of considerable importance in the *control of dosage*. The changes at the site of puncture following inoculation afford a most valuable aid in regard to dosage and interval between doses. For the most advantageous study of the local reaction the inoculation must be made *superficially* in the subcutaneous tissues; if it is made deeper the local changes following inoculation disappear before the surface capillaries are affected. It is especially important to observe: (1) The size of the reddened area. In acute infections a satisfactory dosage is indicated by an area about half to one inch in diameter, a larger area suggesting over-dosage, and absence of reddened area reflecting doubt on the accuracy of the diagnosis. (2) The duration of the reddened area. The reaction is generally at its height at the end of 24 hours, and then gradually disappears. On light palpation with finger and thumb a small, tender, softened nodule is felt at the site of puncture.

Focal Reaction.—In acute infections focal changes following a satisfactory inoculation should not be definite. The prominent symptoms should show a progressive amelioration following inoculation.

General Reaction.

If the dose has been effective, a fall of temperature, rigor, and sweating frequently occur after some 6 to 12 hours, followed by an alleviation of symptoms and a restful sleep.

Intravenous Injection of Vaccine.—The intravenous method of administering vaccine has come more into use in recent years. This method is a safe procedure in chronic localised infections, as the patient is usually not markedly sensitive to vaccine. The intravenous route, however, is definitely contra-indicated in acute infections, in view of the rapidity with which reactions follow, and the tendency of the reactions to be much more severe. Hypersensitiveness or anaphylaxis is almost invariably present in acute infections. A further objection, however, to the intravenous route in acute infections is that it deprives the practitioner of the valuable information provided by the local reaction at the site of inoculation. This reaction, carefully studied and observed, is a valuable means of controlling treatment, giving a definite indication of suitability and timing of doses. It is recommended that the intravenous method be confined solely to chronic infections, in which case much smaller initial doses (from one-fifth to one-tenth of the subcutaneous dose) should be employed. (See table.)

Initial Desensitising Doses in Acute Infections.

Organism.	Adults.	Children.	Infants.
	Doses in millions.		
Streptococcus	3–5	1–2	0·5
Pneumococcus	5–10	2–5	1
Gonococcus	25	10	5
B. Pfeiffer	5–10	2–5	1
M. catarrhalis	5–10	2–5	1
B. coli communis	25	10	5
B. typhosus	25	10	5
B. paratyphosus	25	10	5
B. Friedländer	5–10	2–5	1
B. Bordet	5–10	2–5	1
B. dysenteriæ (sensitised)	2–5	1	0·5
M. melitensis	25	10	5

The activity of vaccine depends to some extent on the method of its preparation—e.g., the character of the medium on which the micro-organisms have been grown, and the processes adopted for the sterilising of the vaccine, such as heating, &c. Thus it is not possible to lay down a hard-and-fast rule in regard to dosage, but the doses for the average preparation can be indicated. Where the same methods of preparing vaccines are always followed, it is possible to standardise each preparation by clinical tests. Each case must be treated on its merits, and the dosage adjusted to the patient's requirements by careful observation of the local reaction.

With reference to the table, it is necessary to emphasise that where one or more micro-organisms are compounded together in the same vaccine, the initial dose of each micro-organism included in the mixed vaccine must be reduced, as combined preparations are liable to be more active and to produce more severe reactions than vaccines prepared from single organisms.

Summary.

1. The present-day attitude in regard to the action of vaccines is that an excess of antibodies is produced in the blood as a result of vaccine injection, which antibodies actually destroy the bacteria, chiefly by dissolving them either in the tissue fluids, or, after ingestion, into leucocytes. This concept does not explain the successful results of minute doses of vaccine in acute infections.

2. The term "anaphylaxis" is frequently erroneously used to imply fatal anaphylactic shock, which practically never occurs in vaccine therapy.

3. Marked anaphylaxis or hypersensitiveness to the related bacterial vaccine is found almost invariably in acute local and general infections, and may be present in a lesser degree, or may be absent in chronic infections.

4. Sensitiveness to vaccine can be demonstrated by inoculation of a minute dose of vaccine which is shortly followed by local, focal, and general effects. Such a dose is without effect on a healthy individual or on a subject not suffering from the infection. These phenomena can be well demonstrated in acute infections of the respiratory tract.

5. Vaccine employed prophylactically in a healthy subject produces an excess of antibodies and frequently an associated leucocytosis.

6. Where the causative micro-organism develops an unusually high degree of virulence, as in a severe epidemic, a cautious prognosis is necessary; the anti-body titre cannot invariably be accepted as evidence of established immunity in an inoculated subject.

7. The action of vaccine employed prophylactically in individuals recently recovered from an acute attack, or suffering from a latent infection, consists of a preliminary desensitisation with small doses gradually increased, until doses sufficiently large are employed to ensure a satisfactory antibody response. The use of large prophylactic doses in individuals still sensitive to vaccine has led to the erroneous view that the vaccine is unduly toxic, whereas the severe reaction is due to a change in the patient or hypersensitiveness.

8. The action of vaccine in chronic infections is comparatively simple, the injection of the antigen or vaccine giving rise to an over-production of antibodies and a varying degree of leucocytosis.

9. The action of vaccine in minute doses in acute local infections consists of a specific desensitisation of the patient to the bacterial toxins generated by the infecting micro-organisms. Repetition of the same dose is followed by gradually diminishing effects until the vaccine is without action in these minute doses. A gradual increase in dosage is made to keep pace with the desensitisation process, until a dose sufficiently large is reached to be effective during convalescence for the production of antibodies, &c.

10. The desensitising dose of vaccine appears to be of the same nature as the anti-anaphylactic dose of Besredka.

11. The action of minute doses of vaccine in acute infections is of the same nature, and depends upon the same principles, as the employment of small doses of weak dilutions of protein for the treatment of protein hypersensitiveness in asthma, &c.

12. The action of vaccine is similar in acute general infections and in acute local infections.

13. The changes at the site of puncture following inoculation (local reaction) afford a most valuable aid to the practitioner in the question of dosage, and the interval between doses. For the most advantageous study of local reaction, inoculation must be made *superficially* in the *subcutaneous* tissues. It is important to observe the size and duration of the reddened area.

14. General reaction consists of a fall of temperature, rigor, and sweating some 6 to 12 hours after inoculation, followed by alleviation of symptoms and, frequently, a restful sleep.

15. The intravenous method of administering vaccine should be confined solely to chronic infections, a reduced dose being used. It is not recommended for acute infections, owing to severe reactions.

16. In regard to dosage each case should be treated on its merits, and the dose adjusted to the requirements of the patient, as observed by the exhibition of minute trial doses.

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EARLIER TREATMENT OF MENTAL DISEASE.—The Lancashire Asylums Board, at its meeting at Preston on Sept. 28th, after discussion passed a resolution that no amendment of the Lunacy Acts would be either satisfactory or adequate which failed to provide for the treatment of mental disease in its early stages before the certification of patients as lunatics, and which did not entirely get rid of the pauper qualification at present insisted upon. In the opinion of the Board, power, should be delegated to local and municipal authorities, so that they may be enabled to establish and control institutions for such uncertified patients.

THE BLOOD COUNT.

IMPROVEMENTS IN METHOD.

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IN the enumeration of the blood corpuscles the sources of error are so numerous and varied that any improvement on the methods at present in use will appeal both to the practitioner and the student. There are three lines along which advances may be made: (1) In the more even distribution of the cells on the counting slide. (2) In the elimination of all possible sources of mechanical error. (3) In the direction of making the counting of blood cells an easier and more rapid procedure.

Uniform Distribution of the Blood Cells.

The problem of the uniform distribution of the blood cells presents the greatest difficulty. It is essential that the blood be taken as quickly as possible after the puncture is made. Unless this is done, it will be found that counts from the same patient vary enormously. After cleansing the skin of the terminal phalanx of the finger with ether, the mouth-piece of the mixing pipette is taken between the lips of the operator ready to suck up the blood. A sharp stab is made, a bandage is applied above the puncture, the first drop of blood wiped away, and the second drop sucked up to the required mark. The end of the pipette is then quickly wiped and plunged into the diluting fluid. The pipette should always be rotated while the fluid is being sucked up, and immediately the mark above the bulb has been reached the end of the capillary tube should be occluded with the finger and the pipette shaken vigorously for one minute. Just before transferring a drop of the mixture to the counting chamber the pipette should be thoroughly shaken again for a minute. Unless this is done a number of corpuscles which have accumulated upon the inner surface of the bulb do not appear in the count. After depositing the drop, the cover-glass should be applied without delay. If more than ten seconds have been allowed to elapse, the distribution of cells will be irregular and the resulting count untrustworthy.

Speed in taking the blood, rotation and vigorous shaking of the pipette, rapidity in applying the cover-glass, and care taken to blow out the fluid from the capillary tube, which contains no corpuscles, are absolutely essential if accuracy is to be attained. Another point of importance is absolute cleanliness and dryness of the pipettes. To ensure this, they should be cleaned by passing the following solutions through them several times in succession: (*a*) Distilled water: (*b*) NaOH; (*c*) absolute alcohol; and (*d*) ether. If the pipette is still moist, dry air should be pumped through by means of a rubber bulb or a pair of bellows.

Notwithstanding the greatest care, it is impossible to obtain really accurate results. The count depends on the fall of the corpuscles on the ruled lines and in the squares of the counting chamber, and an absolutely accurate distribution, with the methods of counting at present employed, is unattainable.

Prevention of Possible Mechanical Errors.

The elimination of all possible sources of mechanical error is all the more important. While experimenting with the new Bürker-Hawksley counting chamber, I found that if the spring clips which secure the cover-glass were fixed upon the edge of the platform of the counting chamber, the pressure caused the thin cover-glass to buckle slightly downwards, and as the depth of the chamber is only 1/10 mm., the count obtained was only about half of what it should have been. When the clips were fixed too far away from each other the opposite effect was obtained. It is necessary therefore to see that the clips are fixed just external to the trench.

Accurate Contact.—There is also a source of error in the contact of the ordinary Thoma-Zeiss cover slip

with the counting chamber. As a proof of accurate contact Newton's rings should be visible, not only at one corner of the cover slide but all round. In order to obtain the rings easily, absolute cleanliness of the opposing surfaces is requisite. I always swab both surfaces with ether, rub them with a soft handkerchief or a piece of chamois leather, and then lightly massage the counting chamber with the thick cover-glass, described below, held between the thumb and first finger of the right hand. Very little pressure is necessary, and if the surfaces are fat-free and dust-free a Newtonian rainbow immediately appears, and completely surrounds the counting chamber. It is important to get the rings before depositing the drop from the mixing pipette. Difficulty is always experienced in obtaining perfect rings when the drop is in situ, whereas if one makes certain of them first, they reappear without manipulation when the preparation is made and the cover slip replaced. Keeping the cover-glass on before use also prevents particles of grit from falling upon the cleaned surfaces. If the rings only appear at one edge, it is not possible to be certain that the corpuscles in exactly 1/10 mm. depth are being deposited upon the counting squares. This occurs when using the ordinary thin Thoma-Zeiss cover-glass.

A Thick Cover-Glass.—To obviate the possibility of error from bending of the cover-glass, I procured from Messrs. Hawksley and Sons a cover-glass 3·8 mm. thick—that is, of the same thickness as the ordinary Thoma-Zeiss counting slide. On cleaning and applying this I found that I was able to secure perfect Newton's rings completely surrounding the counting chamber. The display of colour and the design varies with different cover-glasses, the excellence of the effects obtained being due apparently to the weight of the cover-glass. This device obviates any chance of error as far as the depth of the counting chamber is concerned.

Degree of Magnification Required.—The problem then arose as to the power to be used with the thick cover-glass. It was, of course, impossible to focus with the ordinary high power (1/6 or 1/7 magnification) whilst the squares under the ordinary low power (⅔″ or ¼″ objective and No. 2 or 3 eye-piece) were too small for practical purposes. The difficulty is circumvented by using a No. 18 compensating eye-piece. This with a ⅔″ objective gives an excellent field for counting purposes. The size of the squares can be enlarged still further by pulling out the draw tube of the microscope to the extent required. As the squares are rather smaller than those obtained by the ordinary high power method, the field is larger, and thus in counting, it is not necessary to use the mechanical stage so much. This makes the actual counting a good deal quicker. The thick cover-glass is also much easier to handle. It can be placed over the drop on the counting slide with the fingers, without using a needle to lower it into position. A bubble under the thick cover-glass is rare. Its use thus saves much time and, moreover, it is not easily broken. Another advantage is that in the actual examination with the low power method the squares can be found easily and the count commenced at once. With the ordinary method after locating the squares under the low power the high power has to be turned on, and the field has to be re-focused.

Detailed Examples of Blood Counts.

The following detailed examples of blood counts are of interest; and belong to a series which will be referred to again later.

The first pair of counts for purposes of comparison, using the ordinary high power method, were done on a case of myeloid leukæmia. Blood was drawn up to the mark I. of a red corpuscle pipette, and white corpuscle fluid to the mark 101. Consecutive drops from this pipette were blown on to two separate counting chambers and covered with Thoma-Zeiss cover slips. The corpuscles in 400 squares were counted—these include squares with double rulings.

The calculation was: $\frac{X \times 4000 \times 100}{400} = X \times 1000$.

The number of cells counted in each of the four sets of a 100 squares were:—

1st count: 27, 33, 21, 28 = 109	× 1000 =	109,000
2nd count: 14, 24, 24, 24 = 86	× 1000 =	86,000
Difference		23,000

It will be seen that in the first count 33 cells fell into the second group of 100 squares, while in the second count only 14 cells found a resting-place in the first group of 100 squares. Thus a difference of 19 (33–14) cells in two sets of squares accounts for 19,000 cells of the 23,000 discrepancy above.

Some weeks later, using the same high power method again, and blood from the same patient, I obtained the following result:—

1st count: 16, 19, 23, 16 = 74,000	per c.mm.
2nd count: 24, 15, 19, 16 = 74,000	,, ,,
Difference	Nil.

These counts go to show that a comparatively small difference in the fall of the cells upon the squares makes an enormous difference to the count.

The distribution of the red cells varies in a similar manner. The ordinary method was used, consecutive drops from the same pipette, two counting chambers, and a dilution of 1 in 200. The corpuscles in 100 squares (five rows of 20 squares each) were counted.

The calculation was: $\frac{X \times 4000 \times 200}{100} = X \times 8000$.

The following results were obtained:—

1st count: 73, 95, 112, 110, 104	(494 × 8000) =	3,952,000
2nd count: 110, 99, 131, 121, 78	(539 × 8000) =	4,312,000
Difference		360,000

The actual difference is only 45 corpuscles. A difference of 360,000 seems a very considerable discrepancy, but on analysis we find that in the first count the third and fifth rows produced only 112 and 104 cells, against 131 and 121 in the third and fourth rows of the second count. Thus, out of 45 corpuscles a difference of no less than 36 (19 + 17), or a total of 288,000 (36 × 8000) is due to an uneven distribution over two rows of 20 squares. This works out to an average of less than one corpuscle a square.

The next pair of counts show the "luck of the corpuscular fall" very clearly.

1st count: 74, 88, 82, 76, 82	(402 × 8000) =	3,216,000
2nd count: 77, 99, 72, 78, 76	(402 × 8000) =	3,216,000
Difference		Nil.

This seems a very excellent result and most satisfactory from the point of view of the investigator. On analysis, however, we find that in the second count the second row of 20 squares gave 23 corpuscles in excess of the average of the other four rows—i.e., 99 cells in place of 76, and but for the luck of the fall, instead of the two sets of counts being exactly the same there would have been a difference of 23 × 8000 = 184,000 corpuscles per c.mm.

I have endeavoured by means of the above to show how much the accuracy of the blood count depends upon the distribution of the cells, and I suggest the use of the thick cover-glass method (⅔″ objective and No. 18 compensating eye-piece) because by this means it is possible to avoid any error due to buckling of the cover-glass, and from inaccurate contact between its surface and that of the counting chamber.

In order to prove that this method besides being a much easier and quicker one to use, is also more accurate, I did a series of 150 total white and red blood counts for purposes of comparison. Newtonian rings were an accompaniment of all these counts. The fluids used were Toisson's solution, with 15 g. instead of 30 g. of neutral glycerine for the red corpuscle count, since ordinary Toisson's solution is too viscid. For the leucocytes, I used a 3 per cent. solution of glacial acetic acid, instead of 0·3 or 0·6. The former strength appears to lake the red cells rather more completely, and I am indebted to Dr.

E. H. Kettle for the suggestion. The solution should be coloured with a little methyl green. It is important to employ fairly fresh solutions, as they tend to deteriorate, and to filter them at least twice a week.

The comparisons made below are between the ordinary method—a Thoma-Zeiss cover-glass, the high power (⅛″ objective and No. 3 eye-piece) condenser well up, diaphragm partially closed, and the plane mirror—on the one hand, and on the other the low power method—a cover-glass between 3 and 4 mm. thick, a ⅔″ objective and a No. 18 compensating eye-piece, condensers fairly well down, the plane or concave mirror, and the diaphragm as required. The first 24 counts were made *on the same counting slide*, two counts from each pipette. Great care was taken to shake the pipette thoroughly before a drop was blown out.

I have arranged the series so that differences in the counts can be most easily appreciated.

Ordinary Method.			Thick Cover-slip Method.		
Count.	per c.mm.	Diff.	Count.	per c.mm.	Diff.
1st	10,000		1st	11,500	
2nd	10,300	300	2nd	11,500	Nil.
1st	13,900		1st	15,100	
2nd	13,400	500	2nd	15,100	Nil.
1st	13,500		1st	11,200	
2nd	14,000	500	2nd	11,400	200
1st	9,000		1st	11,100	
2nd	10,500	1,500	2nd	10,900	200
1st	12,800		1st	14,300	
2nd	15,900	3,100	2nd	14,600	300
1st	11,000		1st	11,700	
2nd	13,300	2,300	2nd	10,800	900
1st	9,600		1st	9,100	
2nd	7,000	2,600	2nd	10,400	1,300
Total	164,200	10,800	Total	168,700	2,900

These counts tend to show that the low power method is rather more accurate than the high power method. With a view to obtaining still greater accuracy, I used *two counting chambers*, and consecutive drops from the same pipette for the remaining 124 counts—that is, having taken the blood with the strictest precautions, and having shaken the pipette for a couple of minutes, I blew out the solution in the capillary tube, put a drop on to one counting chamber, lowered its cover-glass into position, then placed the succeeding drop on to the platform of the second counting slide and covered up immediately.

These counts also favour the method in which Newton's rings appear all round the cover-glass.

I next took 50 specimens of blood during the course of a month, from a case of myeloid leukæmia, which was being treated with X rays to the spleen and the following are some typical results:—

Ordinary Method.			Low Power Method.		
Count.	per c.mm.	Diff.	Count.	per c.mm.	Diff.
1st	74,000		1st	97,000	
2nd	74,000	•Nil.	2nd	96,000	1,000
1st	97,000		1st	101,000	
2nd	99,000	2,000	2nd	104,000	3,000
1st	85,000		1st	99,000	
2nd	80,000	5,000	2nd	103,000	4,000
1st	97,000		1st	89,000	
2nd	89,000	8,000	2nd	96,000	7,000
1st	109,000		1st	91,000	
2nd	96,000	13,000	2nd	81,000	10,000
1st	98,000		1st	78,000	
2nd	113,000	15,000	2nd	67,000	11,000
Total	1,111,000	43,000	Total	1,102,000	36,000

Here again the count favours the new method. The series shows the necessity for duplicating the counts in every case, and taking the average of the two.

The final series of 48 are red corpuscle counts. It will be seen from the typical examples given below that the advantage is once more with the method which shows perfect Newtonian rings. Although for the enumeration of the red cells in this series I systematically counted 100 squares, comprising the upper horizontal row of 20 squares, and then each of the four horizontal double-ruled rows—Thoma-Zeiss markings, this is probably not the most accurate way of estimating red blood corpuscles. It is better first, to examine the whole preparation with the low power, in order to ascertain if the corpuscles are fairly uniformly distributed throughout the field. By this means, one is also able to detect the presence of air bubbles, pigment, and other foreign deposits. If the distribution is obviously bad, a fresh preparation should be made, after thoroughly shaking the pipette. If it is only fair, count the five rows which, as far as it is possible to judge, will give the best average result. By introducing the human factor into the count, it is possible to get better results than by slavishly relying on the luck of the corpuscular fall.

Ordinary Method.			Lower Power Method.		
Count.	per c.mm.	Diff	Count.	per c.mm.	Diff.
1st	3,216,000		1st	4,440,000	
2nd	3,216,000	•Nil.	2nd	4,472,000	32,000
1st	5,726,000		1st	4,160,000	
2nd	5,664,000	62,000	2nd	4,088,000	72,000
1st	3,152,000		1st	5,064,000	
2nd	3,256,000	104,000	2nd	4,928,000	136,000
1st	3,408,000		1st	3,576,000	
2nd	3,232,000	176,000	2nd	3,432,000	144,000
1st	4,272,000		1st	5,048,000	
2nd	4,504,000	232,000	2nd	5,212,000	164,000
1st	5,016,000		1st	4,328,000	
2nd	5,376,000	360,000	2nd	4,520,000	192,000
Total	50,038,000	934,000	Total	53,268,000	740,000

Conclusion.

All that is claimed for the thick cover-glass method is: (1) That by using it, the observer is certain of absolutely accurate contact, and that the depth of the counting chamber is exactly 1/10 mm. (2) That the field is an excellent one, although the squares are slightly smaller than in the ordinary method. (3) That the method is much quicker and easier, and that valuable time is saved by its use.

• Details of counts marked thus are given earlier in the article.

THE EFFECT OF POSITION IN THE FAMILY ON THE HEALTH OF THE CHILD.

BY R. H. VERCOE, M.R.C.S., D.P.H.

IN the following table a comparison has been drawn up between the first, second, third, &c., child in the family as regards their relative intelligence, physique, and resistance. The material was obtained during routine medical examination of approximately equal numbers of boys and girls of the same age in the public elementary schools of Colchester (population 45,000) during 1919. Families of less than four children were not included in the series; it was hoped thereby to avoid possible fallacies arising from (*a*) excessive incidence of disease, and (*b*) artificial restriction.

Child.	Age in years and months.	Standard.	Height.	Weight.	Eye.	Hair.	Past diseases.	Present defects— Vision.	Present defects— Other.	No. of cases
	Y. M.									
1	13 6	V·5	144·5	36·4	2·7	3·3	0·41	0·73	0·32	31
2	13 6	V·6	143·5	34·8	3·2	3·6	0·32	0·42	0·13	46
3	13 6	V·7	143·7	36·9	3·1	4·1	0·10	0·02	0·15	40
4	13 5	V·5	145·0	36·8	3·3	3·6	0·17	0·25	0·10	39
5	13 5	V·4	145·3	35·0	3·2	3·0	0·10	0·30	0·30	49
6	13 5	V·4	143·5	35·0	3·2	3·4	0·11	0·18	0·22	27
7	13 4	V·6	144·3	35·7	3·1	3·2	0·09	0·18	0·14	22
8	13 5	V·6	146·1	37·2	3·5	3·7	0·004	0·33	0·004	27

Discussion of Table.

The first vertical column in the table shows the position of the child in the family; under the heading of eighth child are also included ninth, tenth, &c., in order to obtain sufficient numbers of late born children. The second column indicates the age of the child in years and months: thus the average age of the seventh children works out a month younger than any of the others, and the height and weight appear slightly under-estimated in comparison.

The third column indicates intelligence as represented by Standards I. to VII. of the elementary schools. The average at the age of 13½ years lies between Standard V. and Standard VI. in this series.

What little difference there is shows that the degree of intelligence rises slightly from first child to third, then drops to sixth, then finally rises again to eighth. Here the criticism may be made that in some districts the children are automatically pushed up as they grow older into higher standards quite irrespective of their mental capacities, and that therefore the uniformity of standard in the above column is accounted for by the children's ages being the same. In this town, however, the system was to place the child by its mental capacities, and not by its age, with the exception of one school which was specially corrected for by reference of every case to the headmaster. In the other schools there were children of 13 in standards as low as II. and III. Moreover, if age had really decided the standard the above children would all have been in Standard VI. and VII. as they are near school-leaving age.

The fourth and fifth columns show height and weight respectively in centimetres and kilos. The children both tallest and heaviest are the *last* in this series, while those shortest and lightest are the *second and sixth*. There seems little definite advantage in position, but the biggest children are those born last.

The sixth column shows eye colour compared with a scale where blue is represented by 1, grey by 2, green by 3, hazel by 4 (intermediate between blue and black), light brown by 5, dark brown by 6, and very dark brown and black by 7. The average lightest eye in this series is that of the eldest, which is between grey and green inclining to green, whilst the average darkest eye is that of the eighth child, which is exactly intermediate between green and hazel. In the seventh column the hair colour is similarly tabulated, pale yellow being represented by 1, dark yellow by 2, light brown by 3, mouse brown by 4 (intermediate between pale yellow and black), dark brown by 5, very dark brown by 6, black by 7. It will be seen that the degree of hair colour is unevenly distributed down the column. If we add eye and hair indices together the fairest children are the first and fifth, while the darkest are the third and eighth.

The eighth column shows past diseases, which mainly include the history of infectious diseases, pneumonia, &c. Here the *first* and *second* children show a very definitely higher figure than the remainder, whilst the *eighth* child shows very much the lowest figure. This result may be due to (*a*) difference of resistance, and (*b*) the consideration that the older children are exposed to infection from a greater number of susceptibles who are being continually added to, whereas by the time the youngest arrive the rest of the family have largely had the diseases and become immune, and cease to be sources of infection.

The ninth column shows defects of vision, in which the *first* and *second* children are the worst, especially the former, while the third comes out best; this distribution appears rather too irregular to permit the drawing of any very definite conclusion.

The tenth column shows present defects (other than vision) including deformities from disease, morbus cordis, chronic bronchitis, adenoids, &c. Here the eldest child is slightly the worst, and the eighth by far the best.

Conclusions.

From the above table it seems a fair conclusion that in Intelligence, Height, Weight, and Pigmentation there is no appreciable difference between any of the children; whereas in incidence of disease, both past and present, the worst child is definitely the *eldest*, whilst the best is definitely the *eighth* child and upwards. Therefore, as far as this series has been carried, the conclusions are: (1) That the quality of the average child does not deteriorate in any way with successive pregnancies; (2) that the quality of the family does not deteriorate in any way with increase of quantity in the environment and class herein considered; inasmuch as the eighth children, who are drawn entirely from large families, are inferior to none and superior to the eldest who are drawn largely from small families.

A STUDY IN THE DIAGNOSIS OF CANCER BY MEANS OF SERUM REACTIONS.

BY J. A. SHAW-MACKENZIE, M.D. LOND.

(*From the Physiological and Bacteriological Laboratories of King's College, London.*)

IN former communications I have shown that variations in the accelerating or activating power of serum on lipase, as contained in pancreatic extracts or in the juice itself, occur in disease. This power of the serum is decreased in cancer but on improvement or recovery it returns to normal or is increased. The experiments which led to this conclusion have been described in my previous papers.[1] These reactions are not, however, specific to cancer, as similar reactions hold good in infectious diseases, tuberculosis, and in certain non-cancerous conditions. Nevertheless, this decreased power of the serum, when present, has enabled a positive diagnosis of cancer to be made, a diagnosis subsequently confirmed. On the other hand, the absence of the reaction has been of service in excluding the presence of cancer. Recent experiments have been more successful in differentiating cancer from other conditions. In preliminary experiments sodium oleate was found to give a more marked opacity with carcinoma serum than with normal serum, but here again similar results were found in other conditions, for instance in tuberculous serum. I have therefore prepared saponified extracts and ether extracts of cancer tissue,[2] in the hope that these would behave differently from similar extracts of normal tissues, although the lipoids or lipins of both have not been differentiated from one another. These extracts respectively were added in suitable amount to serum of patients suffering from cancer, and when the mixtures were incubated at 37° C. for a given time, usually 18 hours, they have yielded a permanent emulsion or precipitation, cloud or trace of a cloud in the serum. Normal serum and serum from patients not suffering from cancer so far examined have not yielded this result.

Preparation of Extract.—In the preparation of these extracts after thoroughly freeing the fresh cancer tissue from surrounding fat and connective tissue, cutting up or mincing, I have followed (1) the ordinary method of saponification: taking 15 g. of tissue to 100 c.cm. alcoholic sodium hydrate 4 per cent., and after liberating the fatty acids converting them into the sodium salts; or (2) extracting the tissue (25 g. to 125 c.cm.) with the usual solvents, alcohol, ether, and chloroform successively in a Soxhlet's apparatus for 12 hours, and saponifying the extracted material; and (3) extracting the tissue, dried or otherwise, with ether, preferably alcohol-free, alone, in the same way. In this preliminary inquiry I have so far mainly used mammary carcinoma material (scirrhus). I have made also extracts of liver, as well as other extracts of cancer tissue, but my experiments in this direction are incomplete.

Method of Procedure.

I have used chiefly the ether extract alone, diluting the serum with pure sodium chloride (0·85 per cent.) solution in the proportion of 2 or 3 parts of saline to 1 part of serum. In some cases I have employed the saponified extract. This has the advantage of removing, after incubation, any initial cloudiness in normal serum, unless this cloudiness should be too great; or I have used both methods. It may be noted that the addition of pancreatic co-enzyme to normal cloudy serum containing fats after a meal exerts a lipolytic action,[3] resulting in a clear solution of the mixture after incubation. The serum alone does not clear up on simple incubation. The added co-enzyme does not completely affect the clearance in carcinoma serum. In many cases whether precipitation occurred or not on the addition of the saponified extract to the serum, I have ascertained by titration with alkali the amount of fatty or other acid present after incubation. This acidity is less in cancer cases.

Diabetic serum has presented great difficulty. The initial milky character of the serum in such cases has precluded differentiation from cancer or possible associated cancer in given specimens. Protozoal and

infectious disease have not so far been examined; tuberculosis in relation to febrile conditions requires further investigation. In all cases a control normal serum is examined at the same time and under the same conditions. The blood should be collected while the patient is fasting. The serum must be free from hæmoglobin. In cases where the control normal serum is initially cloudy there may be still a trace of cloudiness with the carcinomatous extracts after incubation. The test then resolves itself into a comparison of the degree of turbidity in the control and the suspected serum; this is more marked in carcinoma serum, but where the reaction in this is not pronounced differentiation is difficult. If the result is in doubt the test should be discarded or the experiment be repeated with another control. The dark clot and greenish tinge of the serum so often seen in cancer are not pathognomonic.

Technique.—(*a*) Saponified extract; specimens of 0·3 c.cm. each of the patient's serum are first measured into small glass tubes about 5 mm. in diameter. The measurement is accurately effected by the use of a micrometer screw pressure arrangement connected by stiff rubber tubing to a 1 c.cm. pipette, graduated in tenths and hundredths. To each serum tube 0·3 c.cm. usually of 1 in 5000 and 1 in 3000 water dilution of the extract is added carefully, so that the fluid floats on the serum without admixture. The same is repeated with control normal serum. The tubes are then plugged with cotton-wool and placed in an incubator at 37° C. for a given time, usually 18 hours. They are then removed and the result noted; it varies from opacity, cloudiness, or trace with sometimes a ring more or less marked at the junction of the fluids, in carcinoma serum. The above dilutions at the same time usually show nothing in the control normal serum, whereas the reaction in carcinoma serum has been traced on occasion up to 1 in 10,000 dilution of the extract. The serum should be fresh. All possibility of bacterial contamination must be avoided, as this may readily give an incorrect reading. (*b*) Ether extract; the same procedure is adopted. But in this case the serum is diluted with saline as previously mentioned and 0·3 c.cm. of the diluted serum is taken; 0·3 c.cm. of the undiluted extract is then added and the tubes well capped or corked to prevent evaporation.

Results Obtained.

In the following tables are given the results I have obtained. The total number of sera examined were 136, including malignant disease 46, non-malignant 32, normal 58.

I am indebted to Prof. H. Maclean and Dr. Isaac Jones, St. Thomas's Hospital, for the following specimens (with control normals):—

TABLE I.

No.	Serum (labelled).	Method.	Report or Reaction.	Evidence later.
1	I.	Decreased lipolytic reaction.	Malignant.	Carcinoma stomach.
2	II.		,,	Chronic nephritis.
3	III.		Normal.	Normal.
4	Carcinoma breast.	Carcinoma extract.	Positive.	—
5	Carcinoma stomach.		,,	Carcinoma stomach P.M.
6	? Carcinoma colon.		,,	Carcinoma (operation).
7	? Carcinoma tongue; woman aged 30		,,	Carcinoma (histological).
8, 9, 10	Diabetes.		(see text)	—

Tables II. and III. of cases from the Westminster Hospital are contained in the following notes of cases kindly furnished to me by Mr. Z. S. Kadinsky, surgical registrar there, and I am indebted to the staff for the sera from cases under their care.

Notes by Mr. KADINSKY.

The sera of 61 cases were examined with the following results:—

(1) 36 cases of malignant disease all gave a positive reaction when examined by Dr. Shaw-Mackenzie by his method.

(2) 25 cases of different pathological conditions, other than cancer, all gave a negative reaction.

A number of normal sera were examined and gave a negative reaction. In one case—viz., of neurosis—a positive reaction was given on three different occasions, although no clinical evidence of malignancy was discovered. The 61 cases were patients of Westminster Hospital, and I am obliged to Dr. Braxton Hicks who did all the histological work referred to as evidence of malignancy.

The additional help given by this serum test in the diagnosis of cancer was very striking in cases of carcinoma of the stomach, abdominal tumours, and other obscure cases. For brevity sake only four cases are described, and I am indebted to Sir James Purves Stewart and Dr. A. Abrahams for permission to publish the notes of Case 23, Table III.; to Dr. H. de Souza for Case 16; to Mr. William Turner for Case 24; and to Mr. Arthur Evans for Case 22.

TABLE II.—*Cases of Malignant Disease.*

No.	Disease.	No. of cases.	No.	Disease.	No. of cases.
1	Epithelioma of lip	1		Carcinoma of—	
	Carcinoma of—		17	Peritoneum.	1
2, 3, 4	Tongue.	3	18–31	Breast.	14
5	Pharynx.	1	32, 33	Uterus.	2
6, 7, 8, 9, 10	Stomach.	4	34	Maxillary antrum.	1
	Pancreas.	1	35	Sarcoma (muscle).	1
11, 12	Sigmoid colon.	2			
13, 14, 15, 16	Rectum.	4	36	Hypernephroma.	1

Evidence of malignancy: 22 cases were histologically examined, 9 cases had multiple secondary deposits, 4 cases were found inoperable due to involvement of surrounding parts, 1 case was fungating and inoperable.

TABLE III.—*Cases of Pathological Conditions other than Cancer.*

No.	Disease.	No. of cases.	No.	Disease.	No. of cases.
	Tuberculosis of—		15	Contraction of palmar fascia.	1
1	Lungs.	1	16	Fatty heart (negro).	1
2	Cæcum.	1	17–20	Gastric ulcer.	4
3, 4	Joints.	2	21	Gall-stones.	1
5	Actinomycosis.	1	22	Hydatid of liver.	1
6	Elephantiasis.	1	23	Cirrhosis of liver.	1
7, 8	Syphilis.	2	24	Fibrocystic disease of pancreas.	1
9, 10	Gonorrhœa.	2	25	Nephritis.	1
11	Aneurysm of aorta.	1			
12	Papilloma of nipple.	1			
13, 14	Fibrocystic disease of breast.	2			

CASE 23.—The patient, aged 65 years, an army pensioner, was admitted under the care of Sir James Purves Stewart and Dr. Abrahams suffering from jaundice and wasting. He had been in good health up till six months before admission. The illness began suddenly with acute abdominal pain and vomiting. He vomited once a day for two weeks, then became jaundiced. Jaundice increased rapidly. No history of syphilis. Condition on admission: Pronounced jaundice, marked wasting, liver uniformly and considerably enlarged, slight rigidity of upper abdomen, tenderness over gall-bladder, but gall-bladder not palpable; no ascites. Temperature, pulse, and respiration normal. Urine: Bile present; no Cammidge crystals; diastase D. 38°, 30′ = 30 units. Fæces: Clay coloured, total fat 72 per cent., free fat 51 per cent. Blood: Wassermann reaction negative. In this case there was no indication as to the nature of the condition. The serum reaction was negative, indicating absence of malignant disease. This was confirmed by an exploratory laparotomy (Mr. Evans). The pancreas was normal; the spleen was not enlarged; the gall-bladder contained one small stone; no stone in the common bile-duct. The liver was enlarged, smooth, dark in colour. Evidently a case of hypertrophic cirrhosis.

CASE 16.—The patient (negro), aged 60 years, was admitted under the care of Dr. H. de Souza suffering from advanced cardiac disease with œdema. The object in sending the blood without any information as to the nature of the case or race was to test the reaction in (1) a non-malignant serum, (2) any influence of pigment. The serum was found to have a greenish tinge but the reaction with the carcinoma extract was definitely negative. Post-mortem examination: Marked fatty degeneration of the heart.

CASE 24.—The patient, a man of 78 years of age, was admitted under the care of Mr. Turner, complaining of abdominal discomfort and the presence of a swelling which he had noticed for the last eight months. Three months previous to admission he had some abdominal trouble which came on suddenly and made him very ill for two weeks. Since then he became more and more constipated and lately he noticed a diminution of the size of the stools. The general appearance of the patient was healthy for a man of his age; there was no wasting and no anæmia. An obvious tumour was present in the right hypochondrium, the right lumbar region, and epigastrium; the abdominal tumour was hard, solid, resonant on percussion in the lower half; it presented a round lower border from the margin of which two tense swellings the size of an orange extended backwards to the posterior abdominal wall. The cæcum was distended; there was no ballooning of the rectum. There was no jaundice. Temperature, pulse, and respiration normal. Urine: No bile; urea, 3 per cent.; leucine crystals present. Blood: W.R. negative. The diagnosis lay between (1) malignant disease of the liver, probably secondary to a carcinoma of the hepatic flexure, (2) an inflammatory mass in the liver or the gall-bladder. The chief factor of the case was to decide if the tumour was malignant or not, and the fact that the serum reaction was negative definitely pointed to its non-malignancy. A laparotomy was performed and it was found that below the liver was a cystic mass consisting of vesicles of different sizes containing glairy fluid; some of the cysts were the size of an egg. The whole mass was firmly adherent to the posterior abdominal wall. The abdomen was closed. On the fourth day after the operation the patient had a rigor. After that he rapidly got worse; rigors occurred every fourth or fifth day. Death occurred on the seventeenth day after operation. Post-mortem examination: Liver much enlarged containing several large abscesses. The head and neck of the pancreas were the site of a tumour about 10 in. in diameter covered by cysts. The interior of the tumour was also cystic in places, but the greater part of it was ossified and so hard that it had to be cut with a saw. The pancreatic duct was enlarged and displaced upwards but not compressed; a probe was easily passed through it into the duodenum. Histologically the condition proved to be fibrocystic disease of the pancreas.

CASE 22.—The patient, a labourer, aged 58 years, was admitted under the care of Mr. Evans complaining of abdominal pain, mostly in the right hypochondrium. Six months previously he noticed a swelling in the right side of the abdomen, immediately below the umbilicus: it was painless; three months later he had an attack of pain under the right costal margin; the pain lasted about an hour; it had no relation to food, and recurred daily for several weeks. There was no vomiting, no jaundice, no melæna. Examination: General wasting; marked distension of the abdomen, the eighth, ninth, and tenth costal cartilages noticeably pushed forward. Hard swelling in right hypochondrium, dull on percussion; moves with respiration. Below the umbilicus a second swelling the size of an orange, apparently not connected with the upper one, dull on percussion, hard, freely movable. Deep in the right iliac fossa an elongated mass could be felt. Per rectum, another tumour was found in the middle line in the recto-vesical pouch. Blood count: Serum to corpuscle, 3 to 4; hæmoglobin, 78 per cent.; red corpuscles, 5,510,000 per c.cm., colour index, 0·7; white corpuscles, 9800; polymorphs, 77 per cent.; monomorphs, 23 per cent. Temperature, pulse, and respiration were normal. The probable diagnosis was malignant disease of the liver, secondary to a growth in some viscus. The serum reaction was negative and pointed to some non-malignant condition. Median laparotomy was performed. It was found that the mass in the right hypochondrium was an old hydatid cyst covered with cartilage. It occupied the lower surface of the liver from gall-bladder to umbilical fissure and extending forwards to the abdominal wall. The rest of the liver was much enlarged. On further exploration several masses of a similar nature and of various size were found in the lower margin of the great omentum. In the pelvis several other cysts were present. All were covered with cartilage. It was evident that many years previously the hydatid cyst of the liver had ruptured and that the daughter cysts liberated in the peritoneum were implanted in the omentum and the pelvis, ultimately becoming completely covered by a thick layer of cartilage. The lower part of the omentum with the enclosed cysts was removed and the abdomen closed. On section, the cysts consisted of a cartilaginous capsule containing a shrunken hyaline cyst in which hooklets were easily demonstrated. The only indication prior to operation that this was a benign condition was given by the serum reaction.

I am indebted to Dr. Arthur Davies, Dr. J. Gorsky, and Dr. E. Bach for the sera given in the following table; Cases 6 and 7 came under my own observation.

TABLE IV.

No.	Serum.	Method.	Reaction.	Evidence.
1	Tuberculosis of lung.	Carcinoma extract.	Negative.	—
2	,,	,,	,,	—
3	Carcinoma of breast.	,,	Positive.	—
4	Mediastinal tumour.	,,	,,	Sarcoma p.m.
5	,,	,,	,,	—
6	Carcinoma of pharynx (tuberculous history).	,,	,,	Carcinoma (histological)
7	Carcinoma of skin.	,,	,,	,,

Commentary.

It will be seen from the tables that two errors in diagnosis occurred: (*a*) The first (Table I., Case 2), if I may say so, was avoidable. I omitted to examine the antitryptic power of the serum. This reaction in nephritis, as formerly shown, is normal compared with the well-known increased antitryptic action in malignant disease. In both the power of the serum to accelerate the lipolytic action is decreased. In a further case (Table III., Case 25) of nephritis, examined with carcinoma extract, the reaction was negative. (*b*) I can offer no explanation in the case of neurosis from Westminster Hospital.

In a former paper[4] "On Cancer," by Prof. E. Freund (Vienna), it is stated that carcinoma extract with carcinoma serum and sarcoma extract with sarcoma serum respectively yield a specific turbidity or precipitation, whereas none occurs with non-carcinomatous serum and non-sarcomatous serum. Prof. Freund has favoured me with his further published papers[5] and method by which he diagnoses cancer by opaque serum reactions. This method is based upon the observation that the isolated cells of carcinoma are dissolved by normal serum, whereas the cells are resistant to carcinoma serum. In the former case the destructive action of normal serum on the cancer cell is attributed to the fatty acids of the serum which are not present in carcinoma serum. The test consists in extracting undegenerated carcinoma tissue, preferably post-mortem material, with sodium chloride and monobasic phosphate of sodium solution and pressing the isolated cells through a fine cloth. The emulsion is heated with dilute acetic acid, neutralised, and filtered. If a reliable extract has been obtained this in suitable quantity with carcinoma serum will show distinct opaqueness, whereas normal serum will be transparent. It will thus be seen, without entering into Freund's chemical explanation that his method, though not the same as mine, is partly dependent on a turbidity reaction.

Complement-fixation Tests.

Additional experiments are being undertaken with the saponified extracts of carcinoma tissues, by Dr. C. Pandit, in the bacteriological laboratory. So far 18 tests have been made. Four cases in the above tables—namely, recurrent carcinoma of breast, carcinoma of pancreas, carcinoma of sigmoid, and secondary growth after epithelioma of lip, have been "weakly positive" with saponified ether extract, and 1 case of carcinoma of breast after operation (in good condition) "positive" with the ether and ether-chloroform saponified extracts respectively. The rest of the cases were uniformly "negative" with saponified alcoholic extract.

I am indebted for carcinoma breast material to Mr. W. G. Spencer and Mr. W. Turner (Westminster Hospital), to Sir G. Lenthal Cheatle and Mr. Arthur Edmunds (King's College Hospital), and to Dr. W. Woods (London Hospital, Pathological Institute). I have also to thank Prof. W. D. Halliburton for the opportunity of work in the physiological laboratory, King's College, Prof. R. T. Hewlett in the bacteriological department, and Prof. W. J. R. Simpson. Mr. W. Partridge, lecturer in public health chemistry, King's College, kindly assisted me in the preparation of saponified extracts.

Summary.

This paper draws attention to a new test of cancer by means of a turbidity reaction in the serum. The

test thus resembles Freund's test, alluded to briefly in one of the last paragraphs, but otherwise differs from it in important particulars. It consists in adding an ether extract of cancer tissue, with or without saponification, to cancer serum. This is followed by an appearance of turbidity after incubation which does not appear at all, or not to the same extent, with non-cancerous serum. It is essential that the serum used should be as clear as possible; if turbid to start with the test becomes difficult, for then one has to judge relative turbidities. This difficulty is especially marked in diabetic cases. I have now tested in this way 136 sera, including 58 normal sera, most of them sent to me by various physicians or surgeons. In 41 cases a previous positive or negative diagnosis has been confirmed by the test. In 35 cases in which no details of the cases have been given or the diagnosis was uncertain, a correct diagnosis was made as determined subsequently. In two further cases positive results were not confirmed in patients not suffering from cancer; one was a case of chronic nephritis which (using my older method) is, as noted, explainable; the other was a case of neurosis, and in this case I can offer no explanation.

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Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

THE DETECTION OF MALIGNANT CELLS IN BODY FLUIDS.

BY P. N. PANTON, M.B., B.C. CANTAB.,
CLINICAL PATHOLOGIST TO THE LONDON HOSPITAL.

THE feat of recognising malignant cells in pleural, peritoneal, or cerebro-spinal fluids is one frequently asked of the clinical pathologist and very rarely performed. The difficulty of such a diagnosis results from two causes. The cells from carcinomatous or sarcomatous growths rarely become detached in any numbers so as to float free in the exudates to which they may give rise. Single free cells from such growths have, as a rule, no histological characteristics by which they may be distinguished from the endothelial cells common to exudates due to other causes. Actual fragments of growth may occasionally become detached and pass through the puncture needle, but the possibility of distinguishing even such fragments from clusters of endothelial cells is extremely remote.

Recently a sample of cerebro-spinal fluid was received in the clinical laboratories of the London Hospital. The sample consisted of about 4 c.cm. of misty, faintly yellow fluid, with a small deposit on standing. The faint yellow colour was associated, as usual, with a large excess of protein, and the slight turbidity with a great excess of cells. An examination of these cells coloured by Leishman's stain revealed the presence of cells of a type never previously seen by me in spinal fluid. The cells were of about the size, and resembled somewhat in appearance, the "Rieder" cell of acute myeloid leukæmia, the nuclei were much indented and multilobulated, and many of them showed irregular mitosis. Such cells could not be any of the lymphoid cells commonly present in pathological spinal fluids, nor do endothelial cells occur in any numbers in these fluids. Only two possible explanations presented themselves. The case might be one of acute myeloid leukæmia, a condition at once eliminated by the examination of a blood film, which was normal. (On one occasion the diagnosis of myeloid leukæmia was correctly made in the laboratory from the cellular content of a spinal fluid, presumably owing to an admixture of blood cells with the fluid on making the puncture.) The only alternative explanation was that the cells were derived from a neoplasm involving the central nervous system. The type of cell found made a diagnosis of round-celled sarcoma reasonably certain. A second lumbar puncture performed two days later yielded a fluid precisely similar and containing identical cells.

The patient, W. B., from whom the fluid was obtained, was admitted into the wards of the Medical Unit of the London Hospital, under the care of Dr. Riddoch. He was a man of 55, a syphilitic, with a perforated palate, who had previously been in Moorfields Hospital, where his left eye had been removed for sarcoma 12 months before. Sections of the growth were kindly shown to me by Mr. H. Neame. The growth was a non-pigmented sarcoma of the small round-celled type, and the cells, with their notched indented nuclei and frequent mitotic figures, appeared identical with the cells subsequently found in the spinal fluid. At that time the blood Wassermann was positive. The patient on admission to the London Hospital had the physical signs and symptoms associated with multiple lesions of the roots and spinal cord. The Wassermann reactions of the blood and spinal fluids were then negative. The condition was evidently one of diffuse sarcomatosis of the cord involving the thoracic, lumbar, and sacral regions, and in diffuse soft growths of this nature it is conceivable that numerous cells may become free in the spinal fluid; moreover, it is probable that the needle traversed a portion of the growth in making the puncture.

While the laboratory diagnosis in this case was made independently of the clinical information available, it is evident that sufficient material for diagnosis was present without the assistance of the spinal fluid examination. The case is brought forward rather on account of the rarity of the cytological findings, which were unique in the experience of these laboratories.

A NOTE ON AN UNUSUAL HERNIA.

BY NEIL F. SINCLAIR, F.R.C.S. ENG.,
SENIOR ASSISTANT SURGEON, WEST LONDON HOSPITAL.

THE following case, in which two of the rarer forms of hernia (Littré's and Richter's) coexisted in a single femoral sac, seems worth recording.

The patient, a female, 55 years of age, had noticed a swelling in her left groin for 20 years. Until three days before I saw her it had given rise to no symptoms, but had then suddenly become painful and tender. Frequent vomiting had occurred, but flatus and stools had been passed naturally. Examination revealed a large tense femoral hernia and a soft but slightly distended abdomen. No peristalsis was seen. Taxis had not been attempted. The incomplete nature of the obstruction suggested a Richter's hernia or strangulated omentum.

Operation.—At operation a quantity of turbid and fæcal-smelling fluid escaped from the sac. Along the inner wall of the latter lay a dark-green process closely resembling a gangrenous appendix. Its tip was firmly adherent to the fundus of the sac, and here it had perforated. To the outer side of the process lay a tense purple-black knuckle of intestine. Both process and knuckle were tightly gripped by the crural ring. The sac was cleansed, packed with gauze, and Poupart's ligament divided over the ring. The process proved to be a Meckel's diverticulum, gangrenous in its distal half, and the knuckle to be a Richter's hernia involving two-thirds of the circumference of the lumen of a portion of small intestine some distance from the site of origin of the diverticulum. The diverticulum was amputated and the stump invaginated. It measured 2½ inches. The Richter's hernia did not recover tone and appeared very near perforation. Five inches of ileum containing it were therefore resected and lateral anastomosis performed. Removal of the sac and obliteration of the crural canal completed the operation.

The exact distance on the ileum between the two lesions was not ascertained, as this would have entailed additional manipulation and risk of infection. Convalescence was uneventful, the patient returning home within a month of the operation.

There seems no doubt that the diverticulum had been present in the sac for some considerable time, as shown by the very firm adhesions at its tip, and that its strangulation had been determined by the subsequent passage of the Richter's hernia.

A NOTE ON

DIRECT AND INDIRECT INGUINAL HERNIA ON THE SAME SIDE.

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THE following case is of sufficient interest to merit record.

The patient, an Egyptian baker, aged 40, was admitted to hospital for right inguinal hernia and hydrocele. At operation I found the ordinary indirect "oblique" or "external" hernial sac following the inguinal canal, the length of the sac being about 2 inches. Quite distinct from this sac I found another direct or internal hernial sac, about 1½ inches long, the deep epigastric artery being to the outer side of the neck of the sac. There was also a hydrocele on this side. I ligatured each sac separately, excised the hydrocele, and closed the abdominal wall by Bassini's operation.

I have never previously met this condition, although I myself do about 100 hernia operations a year, nor have I heard of it at Kasr-el-Aini Hospital, where I was at one time registrar, and where about 300 hernia operations a year are performed. I should be interested to hear if the condition reported has been met with and described before.

Medical Societies.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Metropolitan Branch of the Society was held at 1, Upper Montague-street, London, W.C., on Sept. 29th.

Dr. W. H. HAMER, M.O.H. Administrative County of London, delivered the presidential address on

THE LONDON EPIDEMICS OF CHOLERA.

In his presidential address of last session Dr. Hamer had reviewed the evidence as to outbreaks of typhoid fever in the sixties and onwards, which had been attributed to water and to milk infections, and had urged that there was good reason for surmising that many of them were really due to sewage-contaminated fish or shell-fish. He had since made an analysis of the London prevalences of typhoid over the entire notification period—more than 30 years—and he considered that it amplified and confirmed this view. An earlier inquiry (1894–1902) had shown that in 24 areas occupied by poor persons in widely scattered parts of London typhoid prevalences had been prone to occur, often affecting many of them simultaneously, and commonly happening in September and October. He suggested that these prevalences might be attributable to the fish which was brought under suspicion in his reports of 1900 and 1903—viz., that from the shallow "A3 area" in the North Sea, which included the estuary of the Elbe, and abounded with small flat fish. This hypothesis was strengthened by the fact that the London autumnal prevalences, after declining in 1907–12, had practically disappeared during the war; the change coinciding with the disuse of this particular area for trawling purposes.

Dr. Hamer proceeded to review the recorded facts about the London outbreaks of cholera in the last century, with a view to showing the possibility of fish or shell-fish infection having played the part which had been so long ascribed to water infection as a result of the researches of Snow, Simon, Farr, Radcliffe, and others. He recalled that Pettenkofer had consistently held to the "localist" as opposed to the "water theorist" point of view in connexion with the Hamburg and Altona cholera of 1892, in the face of the conclusions of Koch as to river infection.

The 1866 Outbreak of Cholera.

This was an outbreak which had been attributed to water from the Old Ford reservoirs. Radcliffe, in his impartial report, dealt with the objections to the water thesis, and admitted the difficulties which they presented. Certain localities not supplied with Old Ford water were attacked. Certain sections of the population, localities, and institutions escaped, although they were supplied with it. T. Orton, M.O.H. for Limehouse, emphasised similar difficulties: he mentioned that 19 out of 20 adults who perished were not water drinkers even occasionally, and referred to the escape of the 400 children in the Limehouse pauper institution who drank the water all day long and did not show even a single case of common diarrhœa. M. Corner, acting M.O.H. for Mile End Old Town, remarked on the want of simultaneity in the outbreaks, and affirmed that in 100 cases visited by him, not more than 5 per cent. had drunk of the water at all, and those only after it had been boiled. It seemed clear from Radcliffe's map that the areas specially attacked were limited to certain streets, courts, and alleys occupied by the very poor, and Dr. Hamer pointed out that a noteworthy feature was the focussing of the cholera mortality in the areas surrounding certain market streets, especially Salmon-lane and Chrisp-street, then, as now, well-known coster fish markets. Simon, in his appended note to Radcliffe's report, alluded to the difficulty of conceiving that cholera should not have been carried indiscriminately wherever the water was drunk, if the drinking of it were an essential condition of the outbreak, and appeared to be inclined to the view that the water may have "operated on or through the soil of the territory." Dr. Hamer remarked that there was need of explanation not merely of variation of incidence "with difference of soil and altitude," but also with social differences, and in particular with concentration of fatal cases around coster fish markets.

The 1854 Outbreak.

This was attributed to the Southwark and Vauxhall water. The case against the water rested on Snow's preliminary spade work and Simon's classical report. Simon adopted just as careful an attitude towards the water hypothesis as did Radcliffe 12 years later. He was strongly influenced by Snow's advocacy of the theory, though restrained by Pettenkofer's opposite views in relation to the Munich experience. Simon submitted that the population drinking the Southwark and Vauxhall water suffered three and a half times as much mortality as the population drinking the water supplied by the Lambeth company (and, even when they lived in the same streets, nearly three times as much); and that consumers of Lambeth water, which in 1849 was taken from the tidal portion of the Thames, suffered in the outbreak of that year more than three times as severely as in 1854, when the source of supply had been removed from Hungerford Bridge to Thames Ditton, well above the influence of London sewage.

Dr. Hamer called attention to objections to the water hypothesis similar to those he had advanced in connexion with the 1866 outbreak. The incidence was highly selective, and much was written at the time about the influence of altitude and the incidence on people living near the river and in an insanitary environment. It was clear that limited groups of poor persons were especially liable to attack; those, for instance, occupying certain courts or alleys, or housed in particular institutions, residential schools, prisons, workhouses, &c. Dr. Hamer did not consider it as being by any means conclusively shown that the difference between the one water-supply and the other was the deciding factor. Snow had evidently had difficulties in assigning the supply in many houses, and there was also evidence against the assumption that the consumers of the two water-supplies were otherwise on a par. On the contrary, the districts supplied by the Lambeth water appeared to be on the whole less poor. It was difficult also to reconcile the water

thesis with the 611 deaths amongst consumers of Lambeth water in 1853–54, and with the behaviour of the disease in Brixton, Norwood, and Streatham, and in certain institutions. Moreover, the Chelsea water, whose consumers were less hard hit, was (so far as a *chemical* examination was concerned) worse than the Southwark and Vauxhall. It was to be remembered that there was no alternative theory, and that it was a case of water or nothing.

Dr. Hamer then called attention to the fact that at that time the Houses of Parliament and the railway from Vauxhall to Waterloo were being constructed, and North Lambeth was crowded with labourers and particularly poor Irish immigrants; and that in 1845 Hungerford Market was brought into close relation with this population by the construction of Hungerford Bridge. It was highly probable that this market was the source of supply of most of the coster fish sold in Lambeth Upper and Lower Marsh, a neighbourhood heavily attacked by cholera in 1849. It was on record that fishmongers and hawkers were attacked to a disproportionate extent. Hungerford Market did not long remain an important source of supply of fish for the poor, but it was not finally cleared away until 1860, to make room for Charing Cross Station. On these facts the speaker founded a supplemental, if not alternative, hypothesis to the water theory in explanation of the contrasted cholera phenomena of 1849 and 1854. In 1849 the Southwark and Vauxhall intakes were at London Bridge and Battersea, and the Lambeth company's opposite Hungerford Market. Lambeth water had at first a monopoly in North Lambeth, but by 1854 its area had been pressed in upon from east and west by the Southwark and Vauxhall supply, which had reached streets close even to the Lambeth intake. The coster street-markets of North Lambeth in 1849 ran roughly parallel with the river, and at a distance of about one-third of a mile both from the centre of distribution of Lambeth water and from the newly available Hungerford Market. If cholera-infected food was distributed from this market to North Lambeth in 1849, the consumers of Lambeth water might as a result have been brought down, as it were, to the level (qua cholera) of the populations to the east and west who consumed the Southwark and Vauxhall water; and both groups of population, on this hypothesis, might have been more or less equally affected (as, in fact, they were). Dr. Hamer then proceeded to say that, suppose now the presumed Hungerford Market centre of infection, in full operation in 1849, had in large degree ceased to function in 1854, this would explain the greater development of cholera in Southwark and Bermondsey as compared with North Lambeth in the latter year, equally as well as the removal of the Lambeth water intake to Thames Ditton.

There was a further consideration to keep in mind: up to the forties the river was less polluted with sewage, and river fishing was carried on locally by fishermen of Wandsworth, Lambeth, &c., and such local fish-supplies may have played some part in cholera distribution even up to 1854. By 1866 the condition of the Thames in London must have been incompatible with the existence of fish. Parenthetically it was remarked that Mayhew estimated in 1851 that London costers sold annually to the London poor half a million of flounders and dabs at a penny a dozen, 29 million plaice at an average of ½*d.* each, and 124 million oysters at four a penny. In large part these came from the Thames river and estuary. In 1894 Bulstrode estimated that the total yield of all the English oyster-fisheries was less than 28 million, the price being 6*s.* 1*d.* a hundred. Flounders and dabs were no longer forthcoming from the Thames, and the sale of small plaice was also much reduced. The speaker commented on the possible influence of these changes in connexion with the reduction in intestinal infectious diseases.

The "Broad-street Pump" Outbreak.

This was an outbreak of cholera beginning a few weeks after the one just described. A large group of cases occurred in St. James's, Westminster, in an area in the neighbourhood of this pump, and the outbreak came to an end soon after the pump-handle was removed. Dr. Hamer claimed that the evidence incriminating the pump water was far from convincing. Snow's conclusion was based upon an inquiry into 83 cases "in the locality belonging to the pump" dying in the week ended Sept. 2nd, 1854, which yielded 61 instances in which the deceased persons used to drink the pump water from Broad-street, and six cases in which they had not drunk the water. But there were about a thousand deaths in the five weeks ended Sept. 30th which formed part of the same prevalence (in an area within a half or three-quarters of a mile of Broad-street at its junction with Berwick-street), and Snow's pump-water theory could by no means be accepted on these figures. A committee at the time, composed of Arnott, Baly, Farr, Owen, and Simon also came to the conclusion that the pump water was not incriminated. In the absence of any other working hypothesis, Dr. Hamer said that it was of interest to note that the Berwick-street coster-market, which had at that time recently assumed importance as a source of fish supply, following upon the removal of the Oxford-street or St. George's Market, was just at the centre of explosion of cholera. He suggested that all the three principal centres of London cholera in 1854 (the "Southwark and Vauxhall," the "Broad-street Pump," and that in Hughes Field, Deptford, which was also attributed to water-supply), and the behaviour of the disease in London as a whole, accorded more naturally and simply with a thesis of fish or shell-fish origin than with the thesis of water causation.

Earlier Cholera Outbreaks.

Though Snow's first report appeared in 1849 the water thesis did not dominate the writings on the early outbreaks. The Board of Health's report of 1850 emphasised that the epidemic "attacked in groups," and that the disease was not in the ordinary sense "contagious." It was recognised that well-to-do localities escaped, and that such districts as Dulwich, Norwood, and Brixton were proverbially healthy, the excess arising in those districts where there were "defective sewerage, overcrowding, &c." Dr. Hamer observed that the water was consumed by rich and poor alike, and that the defective sewerage, the overcrowding, and the "&c." affected mainly the poor. All this accorded closely with the modern behaviour of typhoid fever. The reports emphasised that (1) the haunts of cholera were the haunts of fever, (2) cholera occurred on the banks of harbours, rivers, foul canals, and ditches, and (3) cholera was associated with bad food ("the oily kinds of fish as well as shell-fish"; "distinctly traceable to putrid fish"; "the influence of river localities"; "the only food they could procure....mussels"; "salted and shell-fish").

Conclusion.

Dr. Hamer said, in conclusion, that the review of the history of cholera in London enforced the lessons learned from the study of typhoid fever, and supported the claim now being made for the regulation of the marketing of small fish from shallow water areas; past experience emphasised the need for supervision of the sale of such fish, in the event of its reaching the seaports and markets of this country and thus being distributed among the poor in large industrial and mining centres.

MEASLES IN MANCHESTER.—The epidemic is steadily decreasing. For the week ended Sept. 23rd there were 267 new cases and 6 deaths, the total being less than half the weekly average for the preceding six weeks.

VIRUS DISEASES IN PLANTS, ANIMALS, AND MAN.—A general meeting of the Association of Economic Biologists will be held at 2.30 P.M. on Oct. 13th in the Botanical Lecture Theatre of the Imperial College of Science, London, S.W. 7, when a discussion on Virus Diseases will be opened by Dr. E. J. Butler, who will speak on Virus Diseases in Plants, and Dr. J. A. Arkwright, who will speak on Virus Diseases in Animals and Man.

Reviews and Notices of Books.

THE PSYCHOLOGY OF THE CRIMINAL.

By M. HAMBLIN SMITH, M.A., M.D., Medical Officer to H.M. Prison, Birmingham; Lecturer on Criminology in the University of Birmingham and at Bethlem Royal Hospital, London. London: Methuen and Co. 1922. Pp. 182. 6s.

THE psychological investigation and treatment of delinquents carried out in connexion with the Chicago Juvenile Court, described by Dr. William Healy, stand out as pioneer work. To this work Dr. Hamblin Smith pays due tribute in his preface. In this country Birmingham has taken the lead in the study of criminology, and Dr. Hamblin Smith's duties there have served as inspiration for a treatise to the writing of which has been brought a rare combination of long experience in prison work, knowledge of modern psychology, and courage in the expression of opinion.

The author classes theories of punishment into retaliatory, deterrent, and reformatory, and the problem before society is why punishment, under certain circumstances, neither deters nor reforms. "The question which we have to solve is this: Why does this particular individual commit anti-social acts? And no answer can be given unless an honest attempt has been made to investigate the individual's mental constitution" (p. 16). For this we must turn to psychology, and here the author, permitting enthusiasm to break through the calm of his logic, says of the hypothesis of the unconscious mind and its investigation that it is "the greatest achievement of modern times, perhaps of all times" (p. 24). This enthusiasm does not prevent him from giving full consideration to the conscious mind, with a constructive criticism of the many tests devised for its investigation. As with "moral sense" and "morality," he rejects "will power" when it implies the existence of an entity called the "will," but adds that argument on the subject is useless. Either a man accepts the deterministic position, or he does not. And this book is, throughout, written on a deterministic basis. To meet the objection that this doctrine runs counter to the idea of man's responsibility for his actions he advances the view of Rosanoff that responsibility in the sense of liability to profitless retribution for wrong-doing does not exist, scientifically, in any case. On the other hand, everybody is responsible in the sense of being liable to forfeit his liberty, property, or the results of his labour, when necessary for the protection of the rights of others or for the restoration of damage caused by him.

Sharply separating the investigation of the unconscious from that of the conscious mind, Dr. Hamblin Smith adopts the Freudian position, and, after noting that Freud, like Copernicus and Darwin, has been the object of contumely and abuse, describes the theory of psycho-analysis. It indicates no fault of the author that he so often finds a need to defend the psycho-analytical position; the necessity exists, and the continuity of his account suffers. Concrete examples are given of cases in which analysis was curative to the delinquent and advantageous to the court in forming decisions. A serious practical difficulty is that the actual findings cannot be mentioned in court or even embodied in a written report, for without complete inviolability it would be impossible to attempt any form of psycho-analysis. For the solution of this delicate problem the court must have the fullest confidence in the examiner, and must be ready to accept his statement that he has discovered a repressed complex which he honestly believes to be the cause of the delinquency, or that he is of opinion that further analysis would be of advantage in throwing more light upon the case, or benefiting the patient by freeing him from the impulse to commit similar offences. A statement the significance of which cannot be over-emphasised is that the author's experience in Birmingham indicates that courts, when they know and trust their examiner, are quite ready to take the view which is put forward here.

The author's courage is shown in facing our most powerful taboo. No one, he says, should attempt to adjudicate on delinquency without having made a thorough study of sexual abnormalities, for the frequency with which one meets them in mental work is amazing. And yet the "masterly work" of Havelock Ellis—his "Studies in the Psychology of Sex"—has to be obtained from America. The author believes that nothing but good would result from the fullest and most free discussion of these subjects. In his summing up, Dr. Hamblin Smith approves the saying of Devon that only one principle in penology is worth attention: "It is to find out why a man does wrong and make it not worth his while." Whether our judicial and penal system accomplishes this, whether we have in any other branch of science proceeded so ignorantly, and yet with so much confidence, are questions to which he gives a plain answer. But he shows also how the remedy has been tested and found good.

"SUGGESTION" AND COMMON SENSE.

By R. ALLAN BENNETT, M.D. Lond., M.R.C.P., Torbay Hospital, Torquay. Bristol: John Wright and Sons. 1922. Pp. 105. 6s.

IN this little book Dr. Bennett intentionally sets aside psychology and writes from the fullness of his own experience. His first chapter, in which he credits the cell with intelligence and speculates as to the ethical virtues ever becoming a part of man's heritage, is not so heterodox as he may think. In discussing suggestion he is satisfied with results rather than explanations, and makes it clear that cure lies in the patient's will to recover; his methods involve the induction of what some would call a hypnoidal state, though persuasion and exhortation have their part. There is a kindly and tolerant note throughout, except when he says of psycho-analysis that "patients whose condition requires such a remedy are better left untreated, better in a mental hospital, better dead" (p. 68). The general practitioner should be helped to recognise therapeutic opportunities by the author's hints and observations: his self-imposed limitations we can only regard as unfortunate in one possessing so much insight into mental processes.

THE ORIGIN OF CANCER.

Essai sur l'origine des cancers et tumeurs. By Dr. JOSEPH STEFANI. Paris: A. Maloine et Fils. 1922. Pp. 209.

Dr. Joseph Stefani, who introduces himself in the preface as a surgeon, presents in this little volume his thoughts on the origin of cancer. He believes that cancer must have an external cause and steps at once to the further conclusion that this external cause must be a parasite. Not an ordinary parasite! It is a unicellular organism, and has the specific property of entering into conjugation with the tissue cells of the higher animals. The results of this process are the cancer cells, which are therefore, as he calls them, "unicellular hybrids." We do not know what kind of cell this parasite is, nor to which species or family it belongs; whether it is animal or vegetable, an alga, a yeast, a microbe, or a protozoon, although the author inclines to believe that it is allied to the protozoa. But what of that? "Nous pouvons le voir avec les yeux de l'esprit et lui donner un nom générique. Nous l'appellerons l'hybridozoaire." No limits as to the specific nature of the organism are imposed by the hypothesis. In fact, the more variable it is and the more numerous the different forms of what the author calls the "providential hybridozoon," the more readily will it explain the different forms in which malignant new growth manifests itself.

All this leads up to the chapter entitled Le problème expérimental, in which Dr. Stefani develops the general plan of research. This is briefly to cultivate normal tissue in vitro, together with all the different

kinds of protozoa and allied organisms that one can get hold of: "Voila comme il faudra procéder pour surprendre en *flagrant délit de conjugaison* (the italics are the author's) les deux partenaires du drame cancérogène." Dr. Stefani's plan of research invests the dull and laborious work of the experimental cancer researcher with a novel flavour which may well attract a host of new workers to this field. But we cannot congratulate him on having offered a notable contribution to the solution of the problems that trouble us with regard to the origin of cancer.

LA CURE DE L'OBÉSITÉ.

By Dr. J. FRUMUSAN. Paris: Cabaut et Cie. 1922. Pp. 192.

AFTER describing the condition of obesity and former methods of treatment, the author gives an account of his own method, which comprises the most valuable parts of several systems in previous use. After a preliminary period of fasting, a normal diet is given, the abdomen is supported by a specially constructed belt, and the patient is subjected to a course of galvanism, iodine ionisation, graduated exercises, and specially chosen diet. Massage, oxygen, and hormone therapy, if used intelligently, also play their parts. The treatment given to the subject is based on the results of experience. Scientific principles are either lacking altogether, or are expounded in such a loose and breezy fashion as to leave us in some doubt as to the author's equipment to speak on the purely scientific aspects of the question. But, to judge by the cases quoted as examples, the results seem to be satisfactory enough.

ARAB MEDICINE AND SURGERY.

A Study of the Healing Art in Algeria. By M. W. HILTON-SIMPSON, B.Sc. London: Humphrey Milford, Oxford University Press. 1922. Pp. 96. 10*s.* 6*d.*

Mr. Hilton-Simpson tells us in his preface that it is with the greatest diffidence that he lays his little work before students of the history of surgery, medicine, and pharmacology, admitting that he is a layman totally untrained in medical science. Be that as it may, he has got a real grip of the subjects of which he treats, and the book bears no internal evidence of having been written by one wholly without medical lore. The author was fortunate enough to gain the friendship of a nomad Arab practitioner, and through him that of some Shawiya practitioners, these latter being a branch of the ancient Berber stock. His researches were principally carried out in the district of the Aures massif, which lies just north-east of the well-known French garrison town and tourist resort of Biskra. He evidently has the gift of extracting information from a class of people naturally reticent. In many ways the Arab and Shawiya practitioners are mediæval, and the mediæval leeches were disinclined to communicate their art and mystery to the laity. Mr. Hilton-Simpson, however, was admitted into all their secrets, and he gives a most interesting account thereof. Part of the book, mainly the portion dealing with the operation of trephining among the Arabs and Shawiya, was read as a paper before the Royal Society of Medicine.[1] Trephining is not performed for cases of "possession," but only for injury, and the method adopted is the primitive one of boring holes around the damaged bone, these holes being then united by a saw. The scalp is either reflected or else a piece is completely removed. The dura mater is scrupulously avoided. The author gives elaborate details as to the operation and after-treatment; success appears to be almost universal. The native surgeons are evidently skilled operators for bone-grafting; bone taken from a dog or sheep is commonly used in gunshot injuries of limbs involving destruction of the bone. Of other surgical operations dropsy is not treated by tapping, as in the Middle Ages and occasionally to-day, but by the introduction of setons into the skin of the abdomen. Syphilis is common, and there is a vast array of remedies, of which mercury in the metallic form and cinnabar are both administered by fumigation.

The book is illustrated by well-reproduced photographs, and we can congratulate Mr. Hilton-Simpson both upon his researches and upon the manner in which he has set forth the results for the benefit of those interested in the history of medicine.

[1] Proc. Roy. Soc. Med., 1920, vol. xiii., p. 47.

READABLE SCHOOL PHYSICS.

By J. A. COCHRANE, B.Sc., Higher Grade School, Thanet, East Lothian. London: G. Bell and Sons, Ltd. 1922. Pp. 131. 2*s.* 4*d.*

THIS work of 131 pages, eight full-sized plates, and 61 illustrations, at such a modest price, is an extraordinary production, and we are no less struck by its educational value. It is a delightful book, in which the schoolboy or girl is introduced to physics in a most attractive manner. The subject-matter is well selected; it is carefully compiled and is particularly free from errors. It is a matter of regret that as the subject of physics becomes more and more studied it becomes less amenable to the sort of treatment carried out so successfully here. Though some serious efforts have been made to write a thoroughly attractive book on physics for medical students, they have so far not achieved complete success.

JOURNALS.

JOURNAL OF THE R.A.M.C. August and September.—Brevet-Major C. H. H. Harold reports a laborious investigation of the Wassermann reaction. He concludes that the Wassermann bodies which give the reaction are solely contained in the euglobulin group of proteids, which are precipitated from blood serum by dilution and acetic acid, also that the amount of precipitable euglobulin in syphilitic sera varies directly as the strength of the Wassermann reaction, though euglobulins and Wassermann bodies are not identical. The demonstration of euglobulins is relatively easy and may have a place in clinical medicine. Euglobulins are found in some cases of malaria, which for the time give positive W. reactions; the hæmolytic bodies in hæmolytic amboceptor are chiefly pseudo-globulins.—Dr. W. Leslie Webb, as a result of some 4000 estimations made in Uganda, concludes that the Sachs-Georgi reaction is much easier to complete than is the Wassermann; it is also, however, less accurate, but still of the utmost value as an aid in the diagnosis of doubtful cases of syphilis in all countries where the Wassermann cannot be performed. Seventy-five per cent. of the population in Uganda is generally believed to have syphilis, congenital or acquired.—Major H. Gall observes that cases of respiratory disease, particularly tonsillitis, have increased in the army, in the navy, and in India since 1905.—Prof. Constantino Krzyszkowsky reports on the epidemics which attacked the Russian army on the Western front. Typhoid began in 1914, antityphoid inoculation only in October, 1916. A double vaccine protecting against both typhoid and cholera was used in the Second Army. Cholera was at its worst in the retreat from Galicia in the autumn of 1915, when a million refugees accompanied the army along the solitary narrow main road that led to Moscow. Typhus had a lower mortality than usual, which the writer thinks may have been due to a secular attenuation of its virulence. In Napoleon's army the mortality was 90 per cent., now only 6 to 10 per cent. Scurvy in its early stages was best treated by sending persons affected to hill stations in the rear.—Major N. V. Lothian and Capt. A. R. Ward discuss the action of chlorinated water on galvanised iron (zinc'd) water tanks. These they find may be well protected by bitumastic paint; 20 parts of zinc per million might be found in water which had stood in a new tank for one day, but it is not alleged that even so much zinc had any deleterious effect upon the troops.

THE LANCET.

LONDON: SATURDAY, OCTOBER 7, 1922.

The Natural History of Encephalitis Lethargica.

CERTAIN epidemic diseases, of which influenza and pneumonic plague are examples, impose on humanity by their crude violence and deadly nature. Others, such as measles and whooping-cough, less sudden, but hardly less deadly in the long run, are taken complacently as the ills of everyday life to which flesh is heir. The less common epidemics rarely excite public interest unless some striking symptom or dramatic setting focuses the light upon them. Such is encephalitis lethargica, a disease whose mystery has been largely cleared up by four years of intensive study. The singular group of cases observed by Dr. WILFRED HARRIS in the metropolitan area, and a similar series noticed by Prof. A. J. HALL in and around Sheffield district in the early months of the year 1918—both reported in the same issue[1] of THE LANCET—at once stimulated curiosity in view of the early appearance of a group of characteristic symptoms of which the first were headache, lethargy, and vomiting, and the second weakness of the oculo-motor muscles and changes of character. For some reason, difficult to explain, the distressing symptom of diplopia has always been regarded by laymen as a subject for jest. Dr. ALLAN C. PARSONS, a medical officer of the Ministry of Health, with the help of Dr. A. SALUSBURY MACNALTY and Dr. J. R. PERDRAU, pathologist to Lambeth Infirmary, has now set out in an exhaustive report[2] what is known of this disease up to the present time. This report includes an analysis of over 1250 cases notified in England and Wales during 1919 and 1920, and a list of books and papers consulted running to 1243 items. Material for the report has been drawn from continental countries and beyond the seas, and the survey concludes with a request in five languages for the indication of errors or omissions in the long bibliography.

As commonly happens in the description of any newly recognised disease, the clinical concept at first adopted had to be widened to include mild and atypical forms. Nevertheless, fever, lethargy, and ocular palsy remain the primary diagnostic features in the disease, as is abundantly clear in the pages of the report. Confusion occurred most frequently with cases of tuberculous meningitis, but cerebral tumours and cerebral hæmorrhage were also found to simulate encephalitis. The other way round, a diagnosis of encephalitis ultimately displaced mistaken diagnoses as follows: poliomyelitis seven times, cerebro-spinal fever four times, typhoid, meningitis, and hysteria, each three times. The guiding signs to diagnosis set out[3] by Dr. MACNALTY in 1918 scarcely need amendment now. These signs are:—

In the Prodromal Period.—An initial catarrhal affection, particularly conjunctivitis, may be suggestive. A change in the patient's mental attitude, taking the form of emotional changes, apathy or extreme restlessness, progressive lethargy, and drowsiness indicate the possibility of the disease. If these symptoms are accompanied by headache, vertigo, asthenia, diplopia, and diminished visual acuity, the possibility is further strengthened.

In the Acute Illness.—The initial period of pyrexia, the characteristic attitude and mask-like face, the profound stupor, from which the patient can usually be aroused, and its alternation in the early stages with delirium, the asthenia, the rigidity, the emotional characteristics, the speech changes, retention of urine, tremors, early vomiting and obstinate constipation, are typical of the disease. The occasional presence of transient rashes may be helpful. Transient remission periods in the disease should be remembered. In the types presenting localising nervous signs the progressive nature of the paralysis is most important. The clearing of one paralysis and the advent of another is to be looked for, as is also the frequency of bilateral lesions, which, however, are never truly symmetrical, being more marked on one side than another. The transient nature of cranial nerve paralysis, when present, is almost conclusive. The frequency of ptosis, paralysis of the ocular muscles, diplopia, facial paralysis, and ocular incoördination are of value.

When the rarity of bilateral facial paralysis in other forms of nervous disease and its frequent occurrence in encephalitis are remembered the presence of this sign is an additional aid to diagnosis.

A negative sign of value is the absence of optic neuritis.

To make the signs complete to date, it would only be necessary to draw attention to the possibility of a sudden onset suggesting apoplexy, to the suggestiveness of myoclonus and choreic movements, and to add that some degree of optic neuritis may occur. Nothing of much practical value has emerged regarding the conditions disposing an individual to attack, but sedentary workers appear to be more susceptible and the age-period of maximum incidence has been from 10 to 20 years—associated fortunately with a greater individual chance of recovery. The mode of infection remains obscure. There is a certain amount of clinical evidence, particularly in cases reported by NETTER and others in France, pointing to transmission by personal contact with an obvious case of the disease. The explosive attack at Derby in August, 1919, is remarkable in this connexion. Experimental work has also given striking support to the hypothesis of the healthy carrier, and attention should certainly be concentrated upon the detection of those who carry infection without suffering themselves from the disease and the best method of dealing with them. The Derby outbreak, apart from its unique intensity, was also noteworthy in providing material for Prof. J. MCINTOSH'S successful transmission of the virus from the human being to a patas monkey. Pathological work carried out by Dr. PERDRAU has since confirmed some of the remarkable results obtained by LEVADITI and others in regard to the relation of the virus of encephalitis lethargica to that of herpes. Dr. PERDRAU has succeeded in conferring protection upon a rabbit by simple inoculation of the skin with the living virus.

It is evident from the report that all the workers have experienced something of adventure in tracking down the natural history of an unfamiliar infective disease so protean in its clinical manifestations and so capricious in its epidemic behaviour. Its study has helped to throw light upon the epidemiology of closely related disorders such as poliomyelitis and cerebro-spinal fever, which in their turn have served to clear up the epidemic prevalence of the new disease. One interesting outcome is that certain forms of paralysis agitans which previously presented many anomalies are now considered as part of the symptom-complex of encephalitis lethargica.

[1] THE LANCET, 1918, i., 568.
[2] Ministry of Health. Reports on Public Health and Medical Subjects. No. 11. Report on Encephalitis Lethargica. H.M. Stationery Office. 10s.
[3] Report to the Local Government Board, New Series, No. 121.

The Medical Aspects of Penology.

THE publication within a short period of three books on English prisons and their inmates gave occasion for reviewing [1] some aspects of the health of prisoners and the healthiness of prisons. This week appears a summary of prison conditions in India. What we are dealing with is something wider than the question of prison administration. Its scope is indicated by the title of this article, borrowed from an address delivered on behalf of the Howard League for Penal Reform to the Medical Women's Federation [2] by Miss MARGERY FRY, J.P., who opened with the striking statement that universities which have found room in their curricula for aeronautics, brewing, oil-mining, and dyeing, have not yet subjected to academic study the profoundly important causes and treatment of crime. As Miss FRY goes on truly to remark, the task of readjusting to communal life that large part of our criminal population which is not incurably antisocial or dangerous demands an all-round knowledge of the workings of both body and mind. The courts as well as the prisons of the future may have large claims to make upon the medical specialist. From personal experience in the diagnosis of moral imbecility, Dr. HENRY HERD formed the opinion [3] that a large proportion of chronic delinquency in children must be regarded as psychoneurosis in the same sense as is hysteria or neurasthenia, and as such remediable by some form of psychotherapeutic treatment; and Dr. CYRIL BURT in a prolonged study of the causes and treatment of juvenile delinquency, completed in the July issue of *Psyche*, found the upshot of the whole matter to be the need for intensive study of each individual offender. For juvenile delinquency, he said, there is no one cause and no one cure. Everything points to the need of what has been aptly termed a "naughtiness clinic."

The relation of psychology to law is apt to focus public attention only when the insanity of a capital offender is in question; but whether a murderer should be hanged or permanently secluded is, though highly charged with emotion, not a matter of such social importance as the study of the ordinary delinquent and the question how his delinquency shall be controlled. The study of the individual delinquent is still, however, confined to a few investigators, and to question the efficacy of punishment appears to some minds, especially legal minds, as an attempt to undermine society. The desire for retribution is instinctive: "He hit me, and *of course* I hit him back," says the child—and rightly, for the emotionally charged instinct is felt as unquestionable. Unlike the child, we add to the retributive idea of justice those of deterrence and reform, the additions sometimes serving to hide the instinctive motive. "This person has sinned: his sin must be punished," is the primitive and undoubtedly useful law; stripped of its emotional urge and adapted to a social end it becomes "This person's behaviour is a social nuisance, in our own interests we must change it." Of serious cases tried at assizes and quarter sessions a large number relate to repeated offences, which indicates that our punishment tariff may fail to achieve the social end. Moreover, the psychological examination of individual offenders, especially juveniles, discovers that the impulse to offend often arises from unconscious motives which punishment cannot affect, and which can be removed only by analysis. The theory involved is revolutionary, and to many of us both ludicrous and incredible. But it may be true. History shows that appeal to authority on matters of active controversy is apt to mislead; appeal to experience is better, and the work of Dr. HAMBLIN SMITH, of Birmingham, whose recent book is reviewed in another column, may become a landmark in the history of penology, though he would perhaps repudiate that word. He has shown that the skilled psychologist may restore to useful social life offenders who seemed on the road to become an expensive burden to the community. The work involves far more than the expression of opinion by a specialist who seeks to mitigate punishment whilst pleading "kleptomania" or "nervous breakdown." This, the usual manner in which the individual problem is presented in our courts, is commonly countered by a variant of the oft-quoted magisterial retort: "Yes, that's the disease *I* am here to cure"—a trite speech that nevertheless expresses the truth. Dr. HAMBLIN SMITH tells how the Birmingham magistrates have accepted the obligation without any interference with the right of society to control the criminal.

[1] THE LANCET, Sept. 23rd, p. 663.
[2] Quarterly News Sheet, July, 1922.
[3] THE LANCET, Sept. 30th, p. 741.

Lead and Growth.

OBSERVATIONS briefly recorded in *Nature* for Sept. 16th by Dr. F. C. GARRETT and HILDA GARRETT raise a number of points of interest. These observers found that larvæ of the eyed hawk-moth, fed on sprigs of apple which had been treated with lead nitrate, ate more, grew faster, matured earlier, and gave rise to larger pupæ and moths than the controls without lead: the larvæ, moreover, remained healthy, while there was considerable disease among the controls. As a parallel they note that the herbage near lead-smelting works contains appreciable quantities of lead, and cases of poisoning from it have been known among sheep. In Weardale, however, the farmers pasture their sheep as near the chimneys as possible, as they consider that they fatten more quickly than on other parts of the moors.

The favourable effect of the lead salt may be due to its antiseptic action on the food or on the intestines of the caterpillars. Could this possibility be excluded, it seems most likely that we have here another example of the general proposition that substances which are in high concentrations poisonous become stimulants when sufficiently diluted, the destructive and stimulating concentrations varying with the particular cell or organism which takes part in the reaction. Arsenic is a well-known example among poisons of known composition. The most modern pharmacologist will hardly claim that the effects of Fowler's solution are purely psychical: its exhibition is sometimes pushed to the demonstration of its selective poisonous action on the nervous system. The Styrian arsenic-eaters are described as remarkable for their clear and blooming complexions, for full rounded figures, and for a healthy appearance, and the same description will apply to the fat, well-liking men who work in arsenic floors. Among more complex poisons, the mixture of bacterial toxins and autolysed tissue which excites the inflammatory reaction of an abscess affords a good illustration. At the centre the concentration is high enough to kill all the cells; the poison diffuses in all directions, and the concentration is soon reduced to the level at which it will kill specialised parenchyma, but will leave leucocytes and connective tissue alive and, at a slightly less strength, stimulate it to develop into protective granulation tissue. Further away still the concentration becomes too low to cause any obvious anatomical reactions except in the leucocyte-forming

tissues throughout the body, though it may still be adequate to induce a general malaise and fever. Lead salts in small quantities are said to increase the yield of corn and other crops, and it is quite possible that Dr. GARRETT'S caterpillars were affected in the same way.

If such be the explanation of his results, there seems to be no immediate parallel in human physiology. Intensive search among the ashes of the body has revealed traces of many elements which cannot be supposed to be essential to its proper working, and, among others, lead has been so detected, derived presumably from the solder of tins, lead pipes, or similar sources. With all the attention that has been paid to industrial lead poisoning, one would expect that any stimulating or tonic effect of small doses would have been identified. No such suggestion has, however, been made. And in their relations to various elements the higher mammals seem to behave differently from invertebrates. Manganese, for example, is a fairly constant, and often considerable, component of plants and invertebrate animals; to mammals it is rather highly poisonous, and never accumulates in the body in more than traces. The worms in the intestines of animals experimentally poisoned with lead are found to contain a much greater concentration of the metal than the bodies of their hosts. Copper, zinc, and such curiosities as titanium and vanadium are found in the lower animals, and it has been claimed that zinc is a useful and regular member of the small number of elements—about 16 out of 90 or more, the rest being "poisonous"—to which evolution has reduced the needs of its ultimate products. Life may well be the residual motion of a universal magma from which most of the elements, and all the heavy ones, have gradually been eliminated.

Annotations.

"Ne quid nimis."

NON-ATTRIBUTABLE DISABILITY.

CONSIDERABLE clamour in the daily press has been excited by the carrying into effect at the beginning of the present week of one of the provisions of the Pensions Warrant of 1917. As is well known, every officer or man who served in the late war is entitled to compensation for disability attributable to or aggravated by service. By Article 7 of the 1917 Warrant, however, the man who entered the service already suffering from a disability and subsequently had to be invalided although his disability was found on or after discharge not to have been aggravated by his service, was given, on discharge from the service, a gratuity or final weekly allowance; and, further, if in-patient treatment for his invaliding disability was required, the cost of maintenance and treatment was borne by the Ministry of Pensions "for the period of the war and one year thereafter." In previous wars no such generous provision was made, but it will be remembered that in previous wars only fit men were enlisted, whereas during the late war, which entailed a supreme national effort, many men were enlisted—and rightly enlisted—with various disabilities, not for service in the front line, but for skilled and unskilled labour at home and at bases abroad.

What could be done to improve these disabilities after enlistment was done by the medical services of the various arms. For those who served only at home the thorough medical overhaul and care, coupled with generous diet and healthy surroundings, compared favourably with the home conditions of their civilian contemporaries. Many thousands of men who are drawing pension for disabilities accepted as due to or aggravated by service were never within sight or hearing of an enemy gun and endured none of the hardships of actual warfare. In many of these cases, however, no improvement of the disability was brought about, and such men, if their condition on being invalided had not been aggravated by service, were dealt with under Article 7. The opinion of the medical board at the time of his discharge as to whether the disability with which the man entered the service was aggravated by his service or not is of grave moment. The Warrant lays down as a condition of acceptance that the disability is attributable to or aggravated *by* service, not *in* service—that is, that the connexion between war service and disablement must be not merely chronological but consequential, in fact must stand in the true relation of cause and effect. How many of the Article 7 awards for non-attributable not-aggravated cases were for mental disabilities cannot easily be ascertained, but we know that about 800 of these men were being treated in asylums at the cost of the State at the end of last month, as compared with 6000 cases accepted, on medical advice, as attributable or aggravated. The war having ended officially on Sept. 30th, 1921, the period during which they could be maintained at the cost of the State and receive the various privileges of "service" classification therefore ended last Saturday.

We are not concerned with the merits of the provision of temporary treatment and allowances in cases neither due to nor aggravated by service. This was decided by Parliament years ago and was undoubtedly a generous act. Nor are we concerned with the fact that in every such case the man, or his responsible relative for him, has had for years a right of appeal to an independent court, which may, or may not, set aside the decision of the Ministry that the disability was neither due to nor aggravated. As in each case, however, the decisive factor has been a medical opinion, generally that of a military or discharge centre medical board, any complaint of injustice becomes an attack on the professional work of these boards. No doubt, as has been stated, these men were passed into the army after examination by the accredited medical representatives of the War Office. They were therefore accepted as in a state to carry on military service. That was inevitable. The difficulty of diagnosing mental defect on enlistment may be illustrated by the experience of a medical superintendent of a large public asylum who, having himself enlisted, examined recruits and not long after, as a battalion medical officer, sent down for invaliding as congenitally deficient and never likely to become efficient soldiers, seven men whom he had himself enlisted. The great bulk of these non-attributable cases were, we understand, men who shortly after enlistment were found to be congenitally defective or epileptic, and unfit for service; who were first observed in hospital and then medically boarded and invalided from the army, without ever leaving this country. On discharge these cases were carefully considered by medical boards who, with full knowledge of the case and having the man before them, came to the conclusion, in each case, that the disability was neither attributable to nor aggravated *by* service.

The suggestion has been made that the action now taken by the Ministry of Pensions in these cases in accordance with the 1917 Warrant is the result of a "revision." This suggestion has no basis in fact. These are men who have never been accepted and whose declassification has taken place automatically. Review is only being made when a man, or his responsible relative for him, appeals against the original decision of "non-attributable, not aggravated" when the whole case is reconsidered by the Ministry before presentation to the Pensions Appeal Tribunal. This reconsideration cannot possibly have the effect of taking anything away from the man; it may, and occasionally does, revise the original decision to the appellant's advantage. We understand that there are still awaiting hearing by the Pensions Appeal Tribunal—a court quite independent of the Ministry, under the Lord Chancellor—a considerable number of such cases, and that to avoid any possible hardship the Minister of Pensions has obtained Treasury sanction to suspend declassification in those cases from the "service patient" class, pending the result of the Appeal Tribunal's decision.

THE PROGNOSTIC EXPLOITATION OF ADRENALIN.

AN interesting question to set a class of senior students would be: Discuss the prognostic uses to which various drugs can be put. Some cudgelling of the brain would be required to give a long list of drugs of value in this connexion, and it is probable that this use of drugs is strictly limited in the hands of most clinicians. According to a paper by Dr. Severyn Sterling in *Paris Médical* for Sept. 9th, the reaction to a hypodermic injection of 1 c.cm. of a 1 in 1000 solution of adrenalin is a useful guide to the future course of a case, a well-defined or violent reaction to a single injection being indicative of reserves of vitality and a capacity on the part of the organism to overcome an infectious process. For several years he has noticed that when the evidence of this reaction has been contrary to that of the general clinical evidence, which has been disquieting, the patient has often given the lie to symptoms by a prompt and complete recovery. Particularly in the case of influenza complicated by disease of the lungs and pleuræ has this test proved helpful. The reaction of the organism to adrenalin is anything but uniform; in some cases there may, apparently, be no reaction. In others—and this is the rule—an injection of adrenalin is followed by pallor of the face, and sometimes by palpitation of the heart, increased pulsation of the temporal arteries, acceleration of the pulse, tremor of the hands, and a slight increase of blood pressure. In acute disease these manifestations may be exaggerated, the patient being seized with a sense of fear and oppression, the pulse-rate increasing by 30 to 60, and the blood pressure rising to 200 mm. of mercury or more. Naturally such a reaction is alarming to the patient and his surroundings, and it is well for the physician to be in a position to reassure all concerned not only of the harmlessness of this transient phenomenon, but also of its favourable import. The absence of reaction is not necessarily of ill omen, and it should be borne in mind that the factors concerned are too numerous to warrant any rule-of-thumb interpretation. Muscular tone is largely under the control of the chromaffin system, and when the tone of the sympathetic nervous mechanism is high there is good reason for assuming that the working capacity of the heart is comparatively good. As well as investigating the adrenalin test in acute disease, Dr. Sterling has for some time been watching its behaviour in tuberculosis, and though his researches in this field are not yet completed, he has come to the conclusion that the adrenalin reaction in tuberculosis can be brought into line with other clinical phenomena on which it is customary to found a prognosis. Interesting as this paper is, it is conceivable that the prognostic information yielded by adrenalin could be as well supplied by blood pressure measurements.

ASEPTIC RENAL INFARCTION.

Dr. Paul W. Aschner,[1] of the Mount Sinai Hospital, New York, records two cases illustrating the practical importance of considering the diagnosis of renal infarction in patients with valvular disease who present symptoms of acute abdominal disorder. Both his patients, a man aged 31 and a woman aged 44, had mitral valvular disease. The onset in each case was sudden, with abdominal cramp, nausea, and vomiting. Albumin, casts, and blood were present in the urine without signs of failing compensation or the usual manifestations of nephritis. In the absence of pyuria the fever and marked polymorphonuclear leucocytosis added to the difficulty of the diagnosis. Operation, which was performed in the case of the man, showed a somewhat enlarged kidney with two greyish-white circumscribed areas, which microscopical examination proved to be anæmic infarcts. No micro-organisms were found in the stained sections. Subsequent recovery was uneventful. In the other case the symptoms subsided without operation. Dr. Aschner has collected other cases from the literature, which he classifies in two main groups, according as they are due to thrombosis of the renal arteries caused by trauma, acute infectious diseases, or subacute and chronic diseases, or to embolism of the renal arteries. Embolism, which is the commonest cause of infarction, was caused by chronic valvular disease in 10 cases, of which 2 were aortic and 8 mitral. The mitral lesions were stenotic, and in two thrombi were found in the left auricle. Aseptic emboli may come from thrombi in the pulmonary veins or the left auricle; from atheromatous lesions, ulcers, fibrinous deposits, thrombi or calcified vegetations on the mitral and aortic valves, and from atheromatous lesions of the aorta. The diagnosis of aseptic renal infarction is established by finding some source for an aseptic embolus (usually valvular disease) or evidence of some constitutional or vascular disease which may produce thrombosis of the renal vessels. The most important symptoms are the sudden onset with abdominal pain and gastro-intestinal disturbance. It is characteristic of the condition for the pain to be referred to the front of the abdomen at first and to be localised to the kidney region later. Pain, however, may be elicited from the first by percussion of the lumbar region, and costo-vertebral tenderness persists after spontaneous pain has ceased. Urinary abnormalities are not constant, but the presence of albumin and red cells in the urine is confirmatory evidence. As regards the prognosis, although the patient may recover completely from the attack of renal infarction, the underlying disease places him in constant danger of subsequent attacks.

[1] American Journal of the Medical Sciences, September, 1922.

COLLOID CHEMISTRY OF THE AIR.

ALTHOUGH colloid chemistry touches medicine at so many places, it is, unfortunately, a region in which the scientific equipment of the medical man is apt to fail him. A large part of the fourth report[1] on Colloidal Chemistry and its general and industrial applications deals with matters such as lubrication and fuels which have no direct medical interest, but a paper entitled Disperse Systems in Gases, by Mr. W. E. Gibbs, D.Sc., appeals to all who are interested in the purification of the air from suspended matter, such as smoke, dust, and bacteria. Dr. Gibbs considers the properties of disperse systems either gas-solid or gas-liquid from many points of view.

1. Their mechanical properties—the concentration, the motion of the particles, and the degree of dispersion.
2. Their optical properties—the absorption, reflection, refraction, and diffraction of light by the system.
3. Their thermal properties—the absorption and radiation of heat.
4. Their electrical properties—the electrical charges upon the particles; their behaviour in an electric field.
5. Their chemical properties—the increased chemical activity of the dispersed substance due to its high degree of dispersion.

In all these ways the dust and water vapour in the atmosphere produce their effects on the life of man. The atmosphere contains an incredibly large number of particles in suspension, as shown by the work of Tyndall in the seventies and later by John Aitken's dust counter. Dr. Gibbs credits the latter with showing that in the air above industrial areas there are often as many as 300,000 dust particles per c.cm. What Aitken really showed was that such air, when cooled by sudden adiabatic expansion, developed that number of cloud particles by condensation of the contained water. It is now known that dust counts deduced in this way are far too high, since condensation occurs on nuclei other than dust. It is to be regretted that Dr. Gibbs has entirely ignored the work of the Advisory Committee on Atmospheric Pollution, the eighth annual report of which is now in the press, for these reports contain a mass of exact information regarding suspended atmospheric impurity. The table of annual

[1] British Association for the Advancement of Science. H.M. Stationery Office. 5s. 6d.

soot fall for Leeds, Glasgow, London, and Pittsburg, which he gives on p. 176, adduces figures which, if correct, are over ten years old. The London figures do not agree with those which appeared in our issue of Jan. 6th, 1912. Pittsburg to-day is not "as clean as Bath"; the smoke nuisance there has again become serious after a short period during which the comparison may have been correct. It is interesting to learn that in the soot from chimneys and flues the most constant feature is the content of rubidium, gallium, and thallium; but the statement is misleading without some information as to the proportion of these rare metals present. To include under the word "dust" all condensation nuclei, solid or liquid, gets over the difficulty of accepting the figures obtained from Aitken's counter but stretches unduly the definition of the term. The article as a whole will repay perusal by those who are interested in atmospheric pollution.

POST-TRAUMATIC TERTIARY SYPHILIS.

THE question of the influence of syphilis in a traumatic injury may become important when it is necessary to decide attributability for the accident in cases where a claim for compensation comes before an insurance tribunal or a medical pensions board. An interesting case of osteo-arthritis of the knee consecutive to trauma forms the subject of a paper by Prof. Salvatore Diez, of the University of Rome.[1]

A workman, when aged 20 years, contracted three preputial ulcers which were not considered syphilitic and which healed spontaneously. Twenty-two years later he struck the internal condyle of his right femur against the step of a tram-car. The knee later on became painful and swollen from exudation of fluid. An exploratory puncture drew off a yellow liquid; injection into a guinea-pig gave a negative result as regards tubercle. As the condition became worse excision of the knee was resorted to resulting in ankylosis in a position of complete extension, but the swelling of the excised region and the pain persisted. Later on the supervention of an acute trigeminal neuralgia led to further investigations, and it transpired that a year previous to the accident a small lump had made its appearance on the man's tongue which quickly disappeared after a few mercurial injections although there had been no other syphilitic manifestations. A Wassermann reaction proved strongly positive, and after four intravenous injections of neosalvarsan all swelling and pain disappeared from the knee.

Admitting, if not with absolute certainty at least with strong probability, a connexion with injury, there ensues a right for the workman to be compensated for the tertiary manifestations with which he was affected; there would be a temporary disability for the whole of the period during which, owing to the post-traumatic syphilitic localisation, he was prevented from following his employment. In the case now reported by Prof. Diez, the subject, having contracted syphilis before sustaining a contusion of his knee, had no manifestations of it until the year previous to the accident, when a gumma made its appearance on the tongue. With the exception of a few mercurial injections given at this time, which were certainly insufficient to ensure sterilisation, he had never been treated. It must therefore be conceded that the infection was latent at the time of the accident and that the organism was in unstable equilibrium as regards immunity. Spirochætes, according to our knowledge of the pathology of syphilis, were present in the circulation and probably in the medulla of the injured bone on the day when the accident happened. Under these conditions, when the state of immunity of nearly 20 years' duration was interrupted (as shown by the appearance of the lingual gumma), the accident occurred. The ordinary signs of contusion appeared, followed after a short interval by symptoms of osteo-myelitis and changes in the joint which later on were proved to be syphilitic in nature. There can be little doubt that the traumatism in a subject now either disimmunised or in an unstable equilibrium towards syphilis had caused in the area of contusion a locus minoris resistentiæ favourable to the localisation and pathogenic development of the spirochætes. It must be noticed that syphilis was not present clinically at the time of the accident and that the contused region had never been the seat of any syphilitic change previously, and was, moreover, the only region in which there was any tertiary localisation subsequently. The close topographical relation between the contused part and the syphilitic manifestation, the close chronological relation between the symptoms caused by the contusion and those due to syphilitic osteo-arthritis, and the latency of the infection at the time when the injury to the knee took place, seem to be sufficient to admit medico-legally the action of trauma as a direct causal agent. It may also be concluded that the contusion by creating a local remission of immunity in the condyle of the femur was the actual disturbing agent of the equilibrium of defence against the spirochætes and the cause of the tertiary syphilitic manifestation and its localisation in the knee. Without the trauma the mono-syphilitic relapse would probably not have occurred, and if the workman had been insured the arthritis would have been considered as attributable to his work and its after-effects would have given him the right to be compensated for permanent partial disablement.

[1] Il Policlinico, xxix., Surgical Section, July 15th, 1922.

THE MANCHESTER SCHOOL OF MEDICINE.

THE opening of the session at the Manchester School of Medicine during the past week, in which Sir Humphry Rolleston as President of the Royal College of Physicians of London took a prominent part, was made the occasion of an important anniversary celebration. The present year is in fact the jubilee of the absorption of the privately owned Royal School of Medicine into the already well-known Owens College—a significant event in the development of the school. This development took place in several directions simultaneously. The Manchester (Royal) Infirmary was founded in 1752, and from 1755 to 1908 was situated in Piccadilly; in 1757 apprentices were first received, for periods of six or seven years, regular pupils being admitted to the infirmary practice in 1793. The apprenticeship system lasted till about 1880, when students were received on the modern régime. General teaching, however, had existed since 1833 in the form of clinical lectures. St. Mary's Hospital was founded as the Manchester and Salford Lying-in Hospital in 1790. In 1783 the first medical lectures ever given in Manchester were delivered by Charles White, assisted by his son Thomas White, in the rooms of the Literary and Philosophical Society, the subjects being anatomy and physiology. Charles White was also prominent in the establishment of the infirmary and lying-in hospital referred to above. In 1787 Thomas White lectured on the theory and practice of midwifery in a museum which formed part of his father's house, and isolated lectures were given in succeeding years by leading medical men in the city (Roget, Ransome, Ainsworth, Gibson). With regard to the qualifications then obtainable by students, it may be noted that a large number of provincial practitioners were unqualified before the passing of the Apothecaries Act, 1815. In England signatures for the Apothecaries Diploma could at first only be obtained in London: largely owing to the persistence of Joseph Jordan, of Manchester, who in 1814 began a school of anatomy in his own house, the barrier was overthrown. Jordan's lectures being recognised in 1817 by the Society of Apothecaries, and in 1821 by the College of Surgeons; the clinical teaching at the infirmary was recognised in 1834, and it then became possible for a student to do all his work in Manchester, although he still had to go elsewhere for his diplomas. Jordan was still teaching anatomy only when in 1824 Thomas Turner opened a school for all subjects in Pine-street; this school, known at various times as the Faulkner-street School and as the Royal School of Medicine and Surgery, was the first complete provincial medical school. In 1834 it absorbed the students and museum of Jordan's School, and finally in 1872 it was merged into the Owens College. Two other schools were the

Marsden-street School (1829–1839), which resulted from a quarrel at Jordan's School, and the Chatham-street School, led by Dr. George Southam; independent from 1850 to 1856, the latter institution was in 1856 amalgamated with the Royal School. Meanwhile, Owens College, founded in 1851, was felt to be incomplete without a medical school, and after long negotiations the Royal School was absorbed. The Pine-street premises of the Royal School were used till 1874, when the new college building in Oxford-road was occupied. Enlargements in 1883 and 1894 brought the medical school to its present size, and an interior rearrangement in 1921 practically doubled the laboratory accommodation for teaching and research. In 1880 Owens College became the first college of the new Victoria University, which in 1883 was empowered to give its own medical degrees. The students of the Manchester Medical School are drawn from a wide and populous area and 90 per cent. of these students now take a Manchester medical degree.

DRUG ADDICTION.

THE world's drug traffic was discussed at a recent meeting of the health committee of the League of Nations, and it was then decided that a crusade of popular enlightenment on the dangers of drug addiction should be undertaken on a world-wide scale. This crusade is independent of the inquiry now in train regarding the world's legitimate need of narcotic drugs for medical purposes and the restrictive measures which may logically follow on the completion of this inquiry. The offer of the League of Red Cross Societies with its machinery in 42 countries for popular health instruction to assist in the work of education and enlightenment was readily accepted by the larger League. This decision enables one to turn from Mr. R. K. Anderson's account of drug smuggling in India[1] with relief born of the hope that some other methods may be effective against the opium curse than the practices to which excise officers in India now have recourse. Bribery, it seems, is met by bribery and corruption by corruption in a not very successful attempt to control the illicit drug trade. Mr. Anderson is not concerned only with bribery and corruption. In his book, written throughout in an entertaining style, the writer introduces us to opium smokers, morphia and cocaine addicts, and the votaries of *Cannabis sativa*. His descriptions of the results of drug addiction to be found in these pages will help greatly the formation of an instructed public opinion. The most challenging sections of the book are those which appear to excuse if not to defend indulgence in opium-smoking and the consumption or smoking of hemp. The arguments he uses against prohibition and in favour of a controlled moderation are curiously reminiscent of arguments recently advanced in a similar controversy concerning the control of alcoholic indulgence in this country. We need scarcely add that a very proper distinction is drawn between the use of opium or coca and that of their alkaloids, and an interesting historical note on the cultivation of and commerce in opium in India is appended.

Dr. E. H. Williams approaches the subject from a different angle. Aware of the fact, "well known to persons familiar with the subject, but not appreciated by the generality of people," that almost every drug addict wishes to be freed from his bondage, he has produced a well-balanced and instructive discussion on the social and therapeutic measures calculated best to serve this end. He is not prepared wholeheartedly to condemn, as it is now fashionable, the gradual reduction treatment of drug addiction. In a few cases, of which he reports two, this method has been known to succeed where others failed. In many other cases it must be considered a *pis aller* and yet not condemned outright. Ambulatory treatment, which must of necessity be by gradual reduction, may not be ideal, but it is perforce adopted for the treatment of many other diseases which would be more efficiently controlled in hospital. In the case of drug addiction the United States citizen must choose between admission to an asylum for the insane, with all its legal unpleasantness and social stigma, treatment in an expensive private institution, and ambulatory treatment. For many this means a choice between the out-patient clinic and no treatment at all. The clinic has certainly many drawbacks and is liable to be abused. But it has social advantages as well—amongst them the practical extinction of the noxious trade carried on by peddlers. If peddlers can be starved out of their trade by the competition of the clinic one of the most fruitful sources of relapse will have been done away with. For the treatment of addicts experience rather than book-learning is required. There is, however, much help to be found by those who are gaining this experience in the descriptions given by Dr. Williams of both the gradual and rapid withdrawal methods.

[1] Drug Smuggling and Taking in India and Burma. By Roy K. Anderson, F.R.S.A., Superintendent, Burma Excise Department. Calcutta and Simla: Thacker, Spink and Co. 1922. Pp. 104.

[2] Opiate Addiction: Its Handling and Treatment. New York: The Macmillan Company. 1922. Pp. 194. 8s.

RIVER POLLUTION BY MILK PRODUCTS.

THE great development during recent years of milk depôts and of factories for the preparation of milk products has given rise to a source of river pollution of considerable importance. In the case of milk depôts the copious summer inflow of milk results in the depôt receiving more milk than it can issue, with the consequence that a portion has to be converted into other products, chiefly cheese. The market for the whey resulting as a by-product of the cheese-making is a very limited one, and as a result large amounts of whey are got rid of by discharge into streams, with prior treatment in varying degree. The treatment is rarely sufficient to prevent grave nuisance arising through the production of evil-smelling scum deposited on vegetation; while the destruction of fish is often of a most extensive and serious character.

The damage is due to two types of pollution—the discharge of whey and the discharge of the washings from floors and from churns and other utensils. The latter, although the less serious of the two, is nevertheless a much more important cause of pollution than is commonly recognised. Dr. W. G. Savage and Mr. D. R. Wood, the county medical officer of health and the public analyst respectively for Somerset, in an interesting and stimulating paper presented before the recent annual congress of the Royal Sanitary Institute, came to the conclusion that about 0·5 per cent. of the milk is lost in spillings and in the washing of churns, &c., so that a factory with a turnover of 4000 gallons of milk a day will run away about 20 gallons of milk a day as waste. Moreover, they calculate that taking the oxygen-absorption capacity as an index, these 20 gallons of waste milk each day are equivalent to not less than 3000 gallons of domestic sewage, or that derived from a population of about 150 people. Serious, however, as this factor for pollution may become, it is much less important than that due to the discharge of whey, on account both of the quantity of the latter involved and of its chemical properties. As regards quantity, the whey to be disposed of is equivalent to nearly nine-tenths of the milk used. The whey contains some 6 to 7 per cent. of solids, chiefly fat, lactose, lactic acid, and proteins. The fat is to a large extent recovered, as this is commercially worth while. The lactose and lactic acid are the chief sources of pollution, owing to their high oxygen-absorbing power. In this respect whey (and also whole milk) are, according to the same authorities, more than equivalent to 150 times as much ordinary sewage. This is a surprising and not generally recognised point. Herein, no doubt, lies the secret of its action not merely on vegetation, but on fish, which are asphyxiated by the water from which the whey has rapidly removed the dissolved oxygen.

The fact of pollution is sufficiently obvious and serious. The remedy, however, is unfortunately not so clear. The disposal of the whey by feeding to pigs, while feasible in theory and to some extent in practice, seems to be limited by commercial considerations. The storage of whey in tanks prior to discharge into the stream results in the fermentation of the lactose, and the production of lactic, butyric, and other organic acids; but it seems that for practical purposes the lactic acid is almost as detrimental as the original lactose. Storage has therefore no marked effect in purifying the whey. The effect of adding chemicals in order to remove excess of acid and allow fermentation to proceed has been studied, but so far no practical method has resulted, owing largely to the solubility of the lactates produced. The treatment of whey on land has in a number of instances resulted in disaster, the land becoming "sick" and the effluent then being capable of putrefaction. Experiment appeared to suggest that, under perfect conditions of soil and drainage, land may be capable of dealing with whey up to 1600 gallons per acre. In practice, however, it is not likely to be able to deal with more than 400 gallons of whey per acre; that is to say, at least eight times as much land as is needed for the treatment of ordinary sewage by surface irrigation. The biological methods of treatment investigated by Dr. Savage and Mr. Wood, such as the addition of special bacteria—e.g., by means of pig manure—and treatment on bacterial filter-beds, had at the time of their report led to no very conclusive result. They state that only when the quantity of whey is quite small in proportion to the total amount of sewage—i.e., in the neighbourhood of 1 per cent.—can it be safely admitted for bacterial treatment on filter-beds. As regards the milk-washings, they consider that these can be treated on the soil with success if sufficient land of good quality is available.

THE MEDICAL DEFENCE UNION.

THE Medical Defence Union is to be congratulated upon the excellent report which was presented at the annual meeting held at Birmingham on Sept. 28th, over which Sir Charles Ballance presided; for never has the membership been so large or the financial position so satisfactory as at the present time. The number of members now exceeds 10,000, of whom 979 have joined since Jan. 1st, 1922. The indemnity insurance scheme, by which members are provided for to the extent of £2500 against damages or costs in any case undertaken by the Council, also shows an increased income, while expenditure has decreased. During 1921 the Union defended 36 actions for malpraxis, prosecuted 9 unqualified persons, and dealt with 7 cases of libel and slander, and 38 cases concerning arbitration and personal matters. The net subscription income for the year 1921 was £7748, an increase of more than £3000 over that for 1919. The useful work carried on by this, the oldest and largest of the medical defence organisations in the country, not only by protection of the public against unauthorised practice, but also by the upholding of the equitable and legal interests of the medical practitioner, deserves the very fullest support; nevertheless, whilst there is a growing tendency for medical men to join an organisation of this kind, there are still a number who do not appreciate the risk they run by not joining some society whose object is to save them both annoyance and money when unjustly accused or when professional amenities have suffered undue strain. Particular stress is laid upon the risk run by medical men who do not avail themselves of the protection afforded by membership of a medical defence association—a risk well illustrated by an assize action at the end of the past year, in which, in spite of medical evidence that no negligence had occurred and that the plaintiff had been treated by the most approved modern methods, the jury returned a verdict for the plaintiff of £750 damages and costs. Had the practitioner concerned been a member of the Union, the whole of his charges, amounting to about £2250, would have been borne by the Union. Another point emphasised in the report is that several cases of impersonation of registered medical practitioners by unqualified persons, especially in the matter of obtaining appointments as ships' surgeons, have been discovered through the activities of the Union. More members than usual have sought advice concerning complaints made against them under the Insurance Acts; in some instances these complaints, which were proved to be unfounded and vexatious, were believed to have been instigated not by the patients, but by persons who make it their business to encourage attacks upon doctors. Many questions relating to professional secrecy have been raised by members; the Council of the Union has advised, as far as possible, in accordance with the general principle that a medical practitioner should not, without his patient's explicit or implied consent, disclose information which he has obtained in his professional relations with his patient. We commend this report to the notice of our readers, especially to such of them as are yet unprotected by mutual guarantee. The address of the Medical Defence Union, Ltd., is 4, Trafalgar-square, London, W.C. 2.

RINGED HAIR.

Dr. Lee D. Cady and Dr. Mildred Trotter,[1] of the Department of Anatomy of the Washington University School of Medicine, have made an elaborate study of the unusual banded appearance of the hair, first described by Karsch in 1846 under the name of pili annulati, denominated leukotrichia annularis by Unna in 1894, and commonly known as ringed hair. Exclusive of cases in three families recently studied by the writers, only 18 cases have been recorded in the literature, examples in this country having been described by Erasmus Wilson, Frazer, Crocker, Galloway, Meachen, and Colcott Fox. On naked-eye examination ringed hair shows alternately light and dark segments, varying in length in different persons. The ends of the segments appear to be sharply defined. Microscopical examination shows that the appearance of the light segments is caused by the presence of very minute spaces filled with gas in the cortex and medulla of the hair. The condition occurs alike in normal pigmented hair and in hair turned grey as a process of senescence. It is not due to a lack of pigment or pigment atrophy. The hairs of the scalp are alone affected; hairs from other parts of the body do not show any evidence of the condition. The cases of Galloway and Brayton show that ringed hairs occur in families and in the three families described by the present writers three generations were affected. As various degrees of the condition occur the writers are convinced that there have been many unrecognised instances in families of patients previously recorded. Various abnormalities have been described in association with it, but their diversity is too great to allow any of them to have an ætiological significance.

TRACHOMA IN THE NEAR EAST.

IN the papers on trachoma in Palestine, which appeared in our original columns last week, the fact is brought out that it is chiefly a disease of children, often beginning in the first year of life, and becoming commoner with each succeeding year until school age is reached, after which the incidence of new cases in those attending the schools steadily diminishes. The same holds good in Egypt where, according to the latest report of Mr. A. F. MacCallan, F.R.C.S., director of Government Ophthalmic Hospitals, trachoma in its serious (i.e., infective) stages is present among children in the first year of school life in 33 per cent., whereas in their fourth year the proportion is reduced to 8 per cent. In considering this subject it is well to bear in mind the following facts. Trachoma is a well-nigh universal disease among the natives of many parts of the East. According to the report on Public Health in Palestine, shortly to be reviewed, an average of 74 per cent. of school-children are affected,

[1] Archives of Dermatology and Syphilology, September, 1922.

in one district the percentage rising to 95. Similar figures hold good in Egypt. Secondly, where good conditions of hygiene can be established they are eminently successful in preventing the spread of the disease, as was proved by the almost complete immunity enjoyed by our troops stationed in Egypt during the late war. Thirdly, school inspection and hospital treatment exert their good results by controlling the spread of infection among the school-children, by shortening the active infective stages both by medical and surgical measures, and by counteracting the effects of the late or cicatricial stages chiefly with surgical measures. In these respects the Egyptian ophthalmic hospitals founded by the late Sir Ernest Cassel and directed by Mr. MacCallan have done a great work. How large a proportion of it is concerned with the results of trachoma is shown by this fact among others. In 1920, the most recent year for which figures are available, out of 33,609 major operations performed, no less than 27,081 were for trichiasis and entropion. Moreover, the treatment given in the early stages of trachoma must have an important effect in diminishing those complications of the disease which lead to corneal nebulæ and so to partial or even complete blindness. As a matter of fact in the Egyptian statistics we do not find that trachoma figures at all as a cause of blindness, though, of course, it is an important cause of defective vision. In Palestine, on the other hand, the report already referred to states that trachoma accounts for most of the blindness and it is well-known that in districts where the disease is allowed to spread entirely without skilled treatment practically complete blindness does often result. This was the case in a rural community of farming folk in South Georgia, where the disease was proceeding unchecked until the advent of an official surgeon from the United States Public Health Service.[1] Finally, the reports from Palestine and Egypt agree that to eradicate the disease altogether the only method is to attack the evil at its source by introducing the practice of elementary hygiene into the homes of the people.

A PROVINCIAL HOSPITAL SURVEY.

Hospital Flag Day is being celebrated in London as we go to press. No doubt the campaign now in progress on behalf of voluntary hospitals would be rendered vastly more effective if the public at large could be made to visualise the extent of the work which is being done in them, as well as the part which they play as centres of health, education, and, therefore, of national progress. From this point of view Sir Napier Burnett's report[2] deserves close attention, while for everyone concerned with hospital finance and management it is priceless as a fund of information. In little more than 100 pages are set out the number of British hospitals, the work done, the sources of income and how that income is expended; and the presentment of the case lends great weight to the arguments of those who hold that the voluntary system should and can be maintained. In 1921, for the first time since the war, the majority of the hospitals were able to pay their way. Taking Great Britain as a whole, and excluding London, details of patients were received from 642 voluntary hospitals (88 per cent. of the total number), with 39,973 available beds (95 per cent. of the total possible); in these hospitals 2,545,055 individual patients were treated during 1921 at a total cost of £5,275,176. Towards this expenditure the hospitals received £4,854,661, leaving a deficit on the year's working of £420,515. One-third of the total ordinary income of the hospitals, it should be noted, was derived from workmen's contributions and patients' payments.

Sir Napier Burnett wishes to impress on his colleagues that the question of payment of the hospital medical staff is really centred on the provision of beds for patients of moderate means, and he appeals to the medical profession to be willing to act in an advisory capacity to hospital governors and trustees who are seeking for a solution of this problem. He finds the classification of medical institutions based merely on the number of beds to be misleading, any true comparison requiring a consideration of work and efficiency. The work done at hospitals to which medical schools are attached is of a special grade and affects a wider community. These hospitals evidently demand a special group, and the figures relating to their work should be set out separately with a view to any claim for assistance from the Exchequer. Sir Arthur Stanley, in a prefatory note, refers to the increasing appreciation on the part of hospital authorities of these annual summaries, for which the Red Cross undertook to be responsible. Since they began to appear there has been renewed evidence of the desire of all those responsible for the management of voluntary hospitals throughout the country to maintain and increase their standard of efficiency.

[1] Public Health Reports, issued weekly by the United States Public Health Service, Sept. 1st, 1922.

[2] Third Annual Report on the Voluntary Hospitals in Great Britain (excluding London) for the Year 1921. By Sir Napier Burnett, K.B.E., M.D., F.R.C.S., F.R.C.P., Director of Hospital Services, Joint Council of the Order of St. John and the British Red Cross Society. With an Introductory Note by the Hon. Sir Arthur Stanley, G.B.E., C.B., M.V.O., Chairman of the Joint Council. Published at 19, Berkeley-street, London, W. 1. Price 2s. 6d.

CELLULAR SELECTION AND CANCER.

SOME years ago Dr. W. J. Penfold showed that the characters of a bacterial growth might be considerably modified by varying the constituents of the culture medium. Among the huge populations which compose an ordinary culture are individuals varying widely from the average in their several physiological capacities. By altering the conditions of life one or other of these variants may be encouraged, either absolutely by furnishing some food of which it is particularly fond, or relatively by killing off its companions by some poisonous agent which it can withstand. In this way the characters of the majority of the individuals, and hence of the culture as a whole, may come to be very different from those of the original growth. Dr. Penfold now suggests[1] that a similar process of selection may account for the production of cancer by the various irritating substances and incidents which are now recognised, experimentally as well as epidemiologically, as definite causes of malignant tumours. Taking aniline as an example, he points out that it may act by killing off a majority of the cells in its field of action, leaving some peculiarly resistant ones, which are then free to grow without the restraint normally exercised by their neighbours. At present there are no definite observations in support of the idea, but it is a suggestive hypothesis which is based on a sound appreciation of the biological significance of variability among large numbers of units.

[1] Medical Journal of Australia, April 29th, 1922.

Sir Frederick Mott will deliver an address on Mental Hygiene in Relation to Insanity and its Treatment, before the Students' Medical Society, Charing Cross Hospital Medical School, on Tuesday, Oct. 10th, at 5 P.M.

To open the autumn session of the South-West London Post-Graduate Association Sir Humphry Rolleston will give an address on the Functions of the Liver at St. James's Hospital, Ouseley-road, Balham, on Wednesday, Oct. 11th, at 4.30 P.M.

THE London Medical Exhibition, the thirteenth of its kind, was held at the Central Hall, Westminster, from Oct. 2nd to 6th and was visited by a large number of medical men and women to whom alone admission was granted. The exhibition was noteworthy for the successful efforts of British manufacturers to meet the progressive needs of medicine. Some 150 stands displayed drugs, chemicals, medical and surgical instruments and appliances, furniture, and other adjuvants to treatment. Notice of the more important exhibits will follow.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

TWO ENGLISH AND TWO SCOTTISH TOWNS.

THE subjoined table gives some of the principal health statistics in four towns, the annual health reports of which show many interesting features.

Town.	Estimated population (1921).	Birth-rate.	Death-rates per 1000 of population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory diseases.	Infant mortality.	Diarrhœa, &c., under 2 years.	Maternal mortality in childbirth.
Glasgow ..	1,034,069	29·1	15·3	1·4	1·2	2·4	105	19	5·8
Liverpool	817,000	26·8	14·3	1·6	1·1	3·1	107	31	3·6
Stockport	125,500	20·4	12·2	1·0	1·3	2·4	91	9	5·8
Paisley ..	84,837	26·3	13·3	1·3	1·0	1·9	94	16	4·0

Glasgow.

Dr. A. K. Chalmers is satisfied that the census underestimated the population of Glasgow and has based his rates for 1921 on a population of 1,075,000. This addition to the census population causes a 4 per cent. reduction on the death-rates. Only the tuberculosis, cancer, and respiratory diseases rates in the table quoted above are based on Dr. Chalmers's estimate. He tells us that the improved atmospheric conditions resulting from the reduced coal consumption during the strike had a markedly favourable effect on the death-rate. A scheme, approved by the Scottish Board of Health, for the supply of milk and meals to necessitous mothers and children came into operation in January, 1921, and owing to the increase of unemployment and the coal strike it was widely applied. About £55,000 was spent on milk and £38,000 on meals. The number of unoccupied houses, which in 1913 was 18,710, has decreased year by year till in 1921 it was reduced to 143. Of these, 33 are one-apartment and 17 two-apartment houses. In the whole city 66 per cent. of the houses have one or two apartments only, and over 60 per cent. of the population live in such houses. Under the heading, "Sex Overcrowding in Small Houses," Dr. Chalmers gives some appalling examples of the results of this pressure. There are 19,000 "ticketed" houses in the city. The regulations governing them only control the number of inmates and do not provide for the separation of the sexes. The reports by the divisional sanitary inspectors emphasise the badness of the housing conditions. The worst case of overcrowding discovered in one division was a family of 13 living in a single apartment, but others approach it closely. The report contains photographs of Cowcaddens Day Nursery (one of seven administered by the corporation), of the Mount Blow and Scotstoun Country Homes for Children, recently opened, and photographs and plans of hospitals and hospital extensions.

Liverpool.

Dr. E. W. Hope prefaces his report for 1921 with some account of the vast sanitary problem which Liverpool has had to tackle. His personal knowledge of Liverpool goes back to 1883, in which year, with a population of 540,000, there were 15,074 deaths, whereas in 1921, with a population of 817,000, there were 11,666 deaths. In 1883, he tells us, there were 23,690 cellars exclusively occupied as dwellings, while the number of cellars occupied as separate dwellings on March 31st, 1921, was 112 only. This is merely one example of changed conditions. Dr. Hope says in his preface that the magnitude of Liverpool's health problems arises primarily from the neglect of sanitation during earlier periods of rapid development of the city's commerce. The importation of infection, unrestricted by any adequate supervision operating upon populations densely massed and periodically indigent, explain why for many years Liverpool occupied a unique position as an insanitary town. The increased fatality of diphtheria which affected Liverpool and other towns in the vicinity during the war reached its maximum in 1918 and has now come to an end. Measles was prevalent during the end of the year. Dr. Hope believes that measles tends to occur in waves which follow each other at intervals of about 92 weeks. He gives charts to illustrate that outbreaks of influenza in Liverpool recur at intervals of 33 weeks and of pneumonia at intervals of 39 weeks, and that when the two recurrences are simultaneous, as in March, 1916, the mortality is exceptionally heavy. Diarrhœa and enteritis took a heavy toll of infant life in 1921, though nothing like that exacted in 1911. A chart is given showing that the mortality corresponded with the prevalence of the common house-fly (*Musca domestica*) and not with that of the lesser house-fly (*Homalomyia canicularis*).

The death-rate from diabetes, which showed a steady rise some years ago, declined during the war, especially in 1917 and 1918. Since the war there has been a rise, but the figures are still below the average for the decade 1910–1919. In 1890–94 55 per cent. of the deaths were of males, but in 1920–21 only 41 per cent. Deaths attributable to excessive drinking show a slight increase, while the deaths of infants from suffocation show a welcome decline. 15,351, or over 70 per cent., of the births were notified by midwives, who sent for medical assistance for 2607 complications. The midwives of the city are nearly all trained women and have for many years been encouraged by the medical officer of health to form themselves into an association, which becomes stronger year by year and arranges special courses of instruction for its members. A rest home for women whose physical condition or home circumstances make extra care desirable before, during, or after confinement, has been provided partly by the generosity of the American Red Cross, and has proved a boon to 157 women in 1920 and to 194 in 1921. The 12 beds and cots provided for the reception of mother and baby at St. Paul's Eye Hospital for dealing with cases of ophthalmia neonatorum have also been appreciated. Nine cases of permanent damage to the sight from this disease were recorded during 1921. A note is kept of the milk-supply of notified cases of non-pulmonary tuberculosis, and when two or more cases occur among the customers of a milk dealer samples of the milk are examined for tubercle bacilli. This procedure led to the discovery of tuberculous milk in several cases during the year. The percentage of tuberculous milk shows an increase for 1921. The city cowsheds are licensed for 4921 cows, and in the cowsheds 21 cows with tuberculosis of the udder were found during the year. As regards milk from sources outside the city, 54 samples out of 507, or more than 10 per cent., were found to be tuberculous.

Dr. Hope cites the good effects of legislation in Western Australia and Ontario in support of his advocacy of a modified notification of venereal diseases in this country for the purpose of securing continuous compulsory treatment of infected persons. The system of providing useful occupation for tuberculous patients at the Fazakerley Sanatorium has been extended. The smoke nuisance does not appear to be taken seriously as yet in Liverpool; only 77 reports of excessive smoke from factories, steamers, and steam wagons were made by the inspectors, who, however, issued 738 cautions. Proceedings were taken in 38 cases and 37 fines were inflicted, but the total amount of fines is only £23 15*s.*—an average of 13*s.* per case. There are no less than 15,332 houses on the register of houses let-in-lodgings, and to these 24,851 night visits were paid for the prevention of overcrowding; 45 convictions were obtained for overcrowding and 37 for non-separation of the sexes. The department

was instrumental in finding other accommodation for lodgers in the case of overcrowded and indecently occupied tenements. The housing schemes in the suburbs have made progress. Contracts have been made for 5784 houses, of which 2968 are completed and 1797 are in progress. In addition, 488 military huts have been converted into bungalows at Knotty Ash Camp. A comprehensive scheme is under consideration for the erection of much-needed abattoirs, meat and cattle markets.

The city bacteriologist reports that 12 milk samples of 131 sent from the city hospitals contained tubercle bacilli, 14 out of 92 sent from the infant welfare centres, and 113 out of 720 obtained at milk shops, railway stations, &c.—making in all 139 infected samples out of 943. He also reports that there was evidence of syphilis in 19 out of 354 stillbirths examined and suspicion in nine other cases. The Liverpool Corporation Act, 1921, provides amongst many other things for the registration and supervision of lying-in homes, a power likely to be extremely valuable. An interesting provision is that for marking taps in dwelling-houses, &c., which come direct from the main with the word "Drinking." It is a curious anomaly that we take much trouble to obtain pure public water-supplies and that the occupiers of a highly rented house as often as not get their drinking water after it has passed through a more or less dirty cistern.

Stockport.

Owing to the death of Dr. H. E. Corbin on Nov. 24th, 1921, the report for 1921 is prepared by his successor, Dr. Arthur G. Jenner. Dr. Jenner points out that the general death-rate is the lowest ever recorded, and that there was a marked fall in the notifications of scarlet fever and diphtheria. One of the events of the year was the opening in October of Glebe House Maternity Home, which will accommodate ten patients at a minimum fee of 30*s.* per week. Only 32 observations of factory chimneys for smoke emissions were made, and there is no mention of any proceedings. The Stockport corporation have retained four beds in the Hyde Small-pox Hospital by agreement with Hyde corporation. Thirty-six cases of ophthalmia neonatorum were notified, with one case of impaired vision and one case of total blindness. There were 2564 births. Of these, 1521 were attended by midwives alone and in 270 cases the midwives sent for medical assistance. The amount paid by the corporation to the doctors called in was £79 2*s.* 6*d.* The Stockport Sick Poor and Private Nursing Association, with a staff consisting of a matron and six nurses, undertakes the nursing of all classes of sickness. No charge is made, but donations to the institution are invited from patients, and recently the Insurance Committee has arranged with the Association for the nursing of sick insured persons at the rate of 1*s.* per visit.

Paisley.

Dr. G. V. T. McMichael submits a comprehensive report for 1920 and 1921, no annual reports having been published since 1914. There was an alarming outbreak of typhus fever during 1920. The first case occurred in April and the last in November. There were 38 definitely diagnosed cases and five probable ones with six deaths. The first case which aroused suspicion was admitted to hospital on June 1st as suspected enteric. A house-to-house visitation revealed four similar cases and a history of similar illnesses in April and May. The first typical attack was that of the night nurse in August. The ambulance driver infected his wife without taking the disease himself. The number of houses affected was 17, 15 of them being one-roomed houses. No source of origin could be traced. An energetic search was kept up for suspicious cases, but there was some difficulty in arranging for isolation of contacts and thorough disinfection, owing to the inadequacy of the reception house. Dr. McMichael lays great stress on the need for isolating contacts for 14 days and for effective powers to deal with filthy and verminous houses. Small-pox was introduced from Glasgow twice during 1920. Energetic measures were adopted and there were no secondary cases. Dr. McMichael thinks all cases of pneumonia should be treated in hospital, and during 1921 115 cases, representing 45 per cent. of those notified, were removed to Bridge-street Hospital. In commenting on the tuberculosis death-rate Dr. McMichael refers to the wretched housing conditions. Of the 2505 births during 1920 635 took place in one-roomed houses and 1533 in two-roomed houses. In the case of 300 of the births which took place in houses of one or two rooms the parents were only lodgers. The report shows that Paisley is exceptionally well equipped with all the institutions and machinery of a modern health department, but an enormous amount of spade-work for the improvement of the environment is needed before satisfactory health conditions can be hoped for.

SCHOOL MEDICAL SERVICE.

Nottingham.

OUT of close on 13,000 children medically examined just over 8 per cent. were found to require actual treatment, and practically the same number were kept under observation. The examination by the school nurses of 36,000 children revealed 15 per cent. more or less unclean. Dental examination of 13,000 showed that 50 per cent. required treatment. Altogether 61·5 per cent. of these defects are treated at the clinics, 30 per cent. get no treatment, and 8·5 per cent. are attended to by hospital or private practitioners. Treatment at both hospital and clinic is free of charge, and Dr. E. M. Wyche reports that the Education Committee feels that the imposition of charges would produce a loss of efficiency out of all proportion to the trifling amount which might be recovered from the parents. Every child operated on for enlarged tonsils or adenoids is retained in hospital for at least 24 hours, and is subsequently visited daily by a school nurse until convalescence is established. A possible result of the comprehensive all-round scheme for examination and treatment is that only 52 out of 637 requiring operative treatment refused it. Dr. A. A. E. Newth makes a report on the Dreyer method of assessing physical fitness, whereby the experimental findings of the spirometer are correlated to the measurements of the body. Whilst the measurements here given show a definite relation between vital capacity and pulmonary and abdominal tubercle, in both the arrested and active form, the other findings—in most classes on only a few cases—appear to have no significance whatever. It is surely pushing the method beyond reason to suggest that appendicitis, lupus, and various other diseases are related in any consequential way to vital capacity.

Stockport.

The report for 1921 shows well over 5000 children inspected under the code groups, and nearly half as many special inspections. Treatment or further observation was required by 34·5 per cent., and a typed list of such children is sent to the department concerned in each school, thus ensuring the teachers' coöperation which is found to be most useful in obtaining treatment. Of 7759 cases requiring treatment, 6405 obtained it. Special attention is being paid to the problem of dirty heads, and intensive examinations in this connexion are made by the nurses. Classes for stammering children have been started and are doing well; only one of the 24 children treated showed no improvement, and this was put down to lack of the necessary coöperation in the home. Spectacles were obtained by only 68 per cent. of the cases requiring them, and in half of these cases they were provided free of charge by the Stockport Blind Institution. Of 162 cases of otorrhœa, 67 were cured. Dr. A. G. Jenner, who is carrying on the work of the late Dr. H. E. Corbin, alludes to the difficulty of making parents realise the great perseverance and patience required to cure this condition, but there are hundreds of cases of otorrhœa attending school clinics all over England five days a week throughout the

year with no apparent improvement. This is a problem which must be probed rigorously at no late date.

Cardiganshire.

The total number of children examined, excluding re-examinations, was 2233, and of these only 3·8 per cent. had no defect. Of 378 cases deferred for treatment for nose and throat trouble 37 received operative treatment. There appears to be some difficulty in obtaining treatment for this defect. Half of those requiring treatment for visual defect received it under the local education authority's scheme. Dental hygiene is receiving special attention; Dr. Meredith Davies must have great difficulty in getting his scheme for the use of tooth-brushes in school put into practice since in many schools there is lack of water. An extensive review of the water-supply and sanitary arrangements reveals 50 out of 100 schools with no water-supply, and ten where the purity of the water is questionable. The number of teachers attending the special classes on physical training shows great enterprise and industry in this department.

BUCHAREST.

(FROM OUR OWN CORRESPONDENT.)

Treatment of Laryngeal Tumours with Sunlight.

AT a recent meeting of the Medical Society Dr. Pheanan showed several cases of laryngeal tubercle which he had treated with great success by the rays of the sun. Hundreds of such cases have been reported of late in various journals, so that this method of treatment has apparently found general adoption. The method is simple, requiring only the use of a concave mirror, and failing this, a toilet mirror; in this latter case a throat lens is necessary, which the patient can easily be taught to manipulate himself. The mirror is hung in a sunny room; the patient seats himself before it, and with his throat mirror can reflect the rays into the larynx where the tumour infiltration or ulceration is present. Under the influence of the rays the tubercles (and some other swellings) disappear in a very short time, seldom exceeding 40 applications. One of the cases presented by Dr. Pheanan had suffered from tuberculous thickening of the left cord with tuberculous ulceration, which was now smooth and pliable after 20 applications. His experience was that the infiltrated forms were more stubborn. He had recently supplemented the treatment by painting the mucous membrane affected with adrenalin in order to increase the specific effect of the rays, as the blood seems to retard their action; he gave also injections of tuberculin, on the lines advocated by Spengler in Germany and Sorgo in Vienna. By applying adrenalin anæmia is produced, and thereby the intensity of the rays on the deeper structures is increased. Unfortunately for this form of treatment weather does not, as a rule, permit of an unbroken course; hence the necessity of resorting to artificial sun rays afforded by mercury-vapour lamps.

Drawbacks of Pasteurisation of Milk.

At a meeting of the sanitary officers in Bucharest it was argued that current views on the value of pasteurisation will have to be altered. The profession has for many years been in the habit of recommending the use of pasteurised milk for the poor of the large towns. Sanitary experts in various countries, however, are contesting the wholesomeness of milk treated by this method. Pasteurisation causes the diminution of bacteria, but the decrease is only temporary, and pasteurised milk when examined a day or two after preparation is found to contain a larger number of bacteria than ordinary milk. The organism chiefly affected by pasteurisation is the lactic acid bacillus, a bacillus which has the merit of making its presence felt by the acidity imparted to the milk. The products of the lactic acid bacillus are quite harmless if, indeed, they have not the positive therapeutic effects imputed to them by Metchnikoff, and therefore it would seem that pasteurisation has the effect of destroying a harmless bacillus whose products, being easily discernible by their acidity, might act as a sign of presence of other organisms. Pasteurisation has no inhibitory power on the growth of these other possibly pathogenic organisms. At the same time it may be granted that pasteurisation does not in any way depreciate the nutritive qualities of milk, whatever effect it may have on it from the point of view of taste.

A Case of Plague in Odessa.

It is reported from Odessa that a case of plague has occurred there, the patient having been assistant cook on board a vessel which arrived from the Far East. When the ship left India it was reported that on board ship all were well. As the ship waited in Odessa for 14 days, and the cook had spent daytime in the city, it was considered probable that he was infected there. In consequence, however, of dead rats being discovered on board, measures were taken to destroy rats and to disinfect the ship. The patient's illness did not develop until the ninth day after the ship landed in Odessa, and it proved fatal after two days. Precautions have been taken for preventing the spread of the disease.

THE MANSON MEMORIAL MEDAL.

ON Sept. 26th, at the London School of Tropical Medicine, the first medal struck in memory of Sir Patrick Manson was presented to Lady Manson. Major-General Sir William Leishman, F.R.S., made the presentation in the presence of a small gathering which

included several of Sir Patrick Manson's most eminent fellow-workers. Sir William Leishman, referring to the feeling among those connected with the school that the building should contain a worthy portrait of Sir Patrick Manson, said that despite the private nature of the appeal made for funds to be devoted to the provision of such a portrait, a sum of £300 was rapidly collected, which left a considerable balance after the portrait had been obtained, together with mezzotint reproductions for presentation to each subscriber to the fund. It was decided to devote this balance to the striking of a medal, to be known as the Manson Memorial Medal, which would be presented triennially to any worker who gained distinction in tropical medicine. Sir William Leishman concluded his short address with a reference to the devoted skill with which Lady Manson had assisted her husband's work, not in direct association in the laboratory, but indirectly by the no less important creation of a sympathetic atmosphere and by encouragement in the

times of difficulty encountered by every research worker. Dr. P. H. Manson-Bahr, son-in-law of Lady Manson, replied briefly on her behalf.

The medal, the obverse of which bears a fine profile portrait reproduced in the accompanying illustration, is in bronze. The reverse bears the words "London School of Tropical Medicine." In future, a device representing "Tropical Medicine and Hygiene" will also appear on the reverse, in recognition of the fact that recipients of the medal will be selected by the Council of the Royal Society of Tropical Medicine and Hygiene. The medal is the work of Mr. J. R. Pinches, of 21, Albert Embankment, London.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Cmdr. E. D. J. O'Malley is placed on retd. list.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. M. Swabey retires on ret. pay.

Maj. and Bt. Lt.-Col. W. F. Tyndale relinquishes the temp. rank of Lt.-Col.

Maj. J. W. S. Seccombe is placed on the half-pay list on account of ill-health.

Maj. F. E. Rowan-Robinson is placed temp. on the half-pay list on account of ill-health.

Capt. D. W. John retires receiving a gratuity and is granted the rank of Maj.

Temp. Capt. G. S. Ware relinquishes his commn. and retains the rank of Capt.

TERRITORIAL ARMY.

Maj. H. H. B. Cunningham resigns his commn. and reverts to the Regular Army Res. of Off. (Royal Irish Fus.), and is granted the rank of Lt.-Col.

Maj. D. H. Weir relinquishes his commn. and is granted the rank of Lt.-Col.

G. F. Wilson to be Capt. with pay and allowances of Lt.

The undermentioned Capts., having attained the age limit, are retired and retain their rank, except where otherwise stated: J. P. Milton, C. H. Caldicott, H. C. Adams, E. Osborne, and F. A. W. Drinkwater (are granted the rank of Maj.), J. Carroll.

Capt. J. H. Robinson relinquishes his commn. and is granted the rank of Maj.

Capt. E. A. Mackenzie relinquishes his commn. and retains the rank of Capt.

FOREIGN DECORATIONS.

His Majesty has given permission to the following to wear the decorations and medals awarded to them by the Allied Powers for distinguished services rendered during the late war: Maj.-Gen. Sir William Grant Macpherson (Distinguished Service Medal, conferred by the President of the United States); Col. Arthur Mayers Connell, T.D., T.F. (Officier of the Ordre de Leopold, conferred by the King of the Belgians); Col. Cathcart Garner and Temp. Lieut. Henry Graham Arnott, R.A.M.C. (Officier and Médaille d'Honneur avec glaives en Vermeil, respectively, of the Légion d'Honneur, conferred by the President of the French Republic); Lieut.-Col. (temp. Col.) James Currie Robertson, I.M.S., and Lieut.-Col. Alfred Edmond Weld, R.A.M.C. (Reserve of Officers) (Officers of the Order of the Crown of Italy, conferred by the King of Italy); Bt. Lieut.-Col. John Allan Anderson, R.A.M.C. (Order of St. Sava, Third Class, conferred by the King of the Serbs).

FRENCH CONGRESS OF DERMATOLOGY AND SYPHILOLOGY.—A congress will be held at Strasbourg in connexion with the Pasteur centenary celebrations on July 25th to 27th, 1923. The questions to be discussed include desensitisation in skin diseases, nævo-carcinomata, the early treatment of syphilis, and the various methods of introducing the curative agent in syphilis. The congress will be preceded by that on cancer, already announced in our columns, and followed by an International Conference on leprosy, which will take place on July 28th and 30th. Further information may be obtained from Prof. Pautrier, 2, Quai St. Nicholas, Strasbourg.

Correspondence.

"Audi alteram partem."

THE DIAGNOSIS OF MORAL IMBECILITY.

To the Editor of THE LANCET.

SIR,—Dr. Henry Herd, in his interesting discussion of the problem of moral imbecility in THE LANCET of Sept. 30th, points out that some modification of the definition contained in the Mental Deficiency Act is necessary. He suggests a new definition under the title "morally defective persons." By this means he gets rid of the difficulty that in the present definitions the word "imbecile" is used side by side in two different connotations. In the term "moral imbecile" the word is clearly used in its older and wider meaning of "weakness." Only in the last 30 years has the meaning attached to the word been narrowed down to that intended in the other definition—viz., a grade of mental deficiency above that of idiocy. When Prichard first described the class of case now labelled "moral imbecility" he designated the condition "moral insanity." The moral deviate shows behaviour aberrations which are of exactly the same general type as those of persons whose conduct brings them within the scope of the Lunacy Act, and the introduction of temporal implications such as early age, permanency, and the association of intellectual defects, as necessarily antecedent for the application of the Mental Deficiency Act, clouds the issue. This difficulty is well shown by the large number of persons who have been committed to prison for antisocial actions, who are subsequently considered to come within the provisions of the Lunacy Act, and are accordingly certified as insane.

It is, however, doubtful whether any new definition will clear away the ambiguity which exists at present. The so-called "definitions" in the Act are generalisations only, which have not sufficient precision to be of assistance in the legal sense, and from the point of view of the certifying medical officer lead to confusion and doubt. The remedy, as has been implicitly suggested by Sir Bryan Donkin (THE LANCET, 1920, ii., 979), appears to lie in a unification of the Lunacy and the Mental Deficiency Acts, simplified by the deletion of the limiting clauses at present contained in the definition clauses of the latter Act. Conduct is the criterion in both enactments, and if an individual in his conduct fails to reach the average level of the common opinion of the time, as expressed by the laws and regulations of the community in which he lives, then a single inclusive Act should be enough to meet the case.

I am, Sir, yours faithfully,

GEORGE A. AUDEN,
School Medical Officer, City of Birmingham.

Sept. 30th, 1922.

PROVISION FOR THE SUBNORMAL EX-SERVICE MAN:

THE NBED FOR A DEMONSTRATION-CENTRE.

To the Editor of THE LANCET.

SIR,—In your timely article of Sept. 23rd on this pressing question you urge the incontrovertible principle that aid must be given to enable injured men to support themselves. But there is now so little money to spare that it seems only fair to the public to inquire whether our existing machinery is upon a sound and economic basis.

The problem of the subnormal worker is a difficult one at the best. The recent Parliamentary Select Committee have recommended certain changes in our way of handling it. Time and altered conditions have certainly introduced new factors into it, and it cannot be overlooked that great outlays of public and private funds have been already made, which have not always produced commensurate results. I would not suggest that this was entirely avoidable. The efforts made to re-educate and place the subnormal worker have been largely experimental. It is only lately that

it has been conclusively proved that the training, occupations, and methods that are appropriate for the slighter and temporary forms of disablement are useless for permanently substandard or subnormal workers. The truth is that industrially and medically they form a separate class, requiring special social provision. That is why I think it is so important at this late stage, when it seems that the country must take some new action, that we should recognise all the facts, if necessary reconsider our opinions, and at all events make sure that we are on the right lines. I speak as one who has been a close student of this matter since the outbreak of the war, and as unconnected with any organisation.

The cardinal point is, of course, the choice of occupations for this class of workers. You refer to agricultural occupations, which are, superficially, so attractive. But unfortunately it has been shown in the present year that even for the able-bodied small holdings may be a poor proposition and economically unsound. What, then, can "pigs, poultry, and gardening" do for the subnormal ex-Service man unless supplemented by more remunerative work? With a little study and imagination many such occupations may be found. The necessary *orientation professionnelle*, in which the medical man, the industrial expert, and the educationist are all concerned, demands much more care and skill than we have hitherto devoted to it. It is, inter alia, a piece of medical research work. The mutual adjustment of disability and industry has occupied some of the best minds in Italy and France. In those countries, as well as in Germany, I understand that this problem has been to a large extent solved by part-time work on the land, combined with highly organised local industries. I do not think that we shall reach a solution in England, where the conditions are, of course, different, until the same study and special knowledge are focussed upon it.

Surely the guiding principle must be that the new occupation of the subnormal worker should be medically right and industrially economic? I fear that our past performances and even our present efforts do not always satisfy this test. We have a good record of achievement in other directions, but our debt to the subnormal ex-Service man has still to be paid. With the best intentions we have sometimes given him what he cannot use. Training for an unsuitable occupation is an expensive and useless gift. Training for an occupation that is economically unsound is even worse. It is a ruinous investment. I must therefore, with all respect, express my dissent from the method of "minimum advice and control" quoted with approval in your article. On the contrary, we are in danger of failing from *too little* special knowledge and individual care, and—to judge from their valuable and suggestive report—this danger is now recognised by the Select Committee.

May I remind you that two years ago a committee, largely medical, of which I had the privilege of being chairman, worked out a detailed plan for the care and settlement of subnormal workers in rural industries? They placed in the forefront of their proposals, as an indispensable means of realising this purpose, a scheme for a demonstration "training-settlement." The Government did not accept the scheme, but an organisation was afterwards founded under the auspices of the Development Commission—the Rural Industries Intelligence Bureau and the Country Industries Coöperative Society, 258, Westminster Bridge-road, London, S.E., which has for its object the development of those types of industry which we recommended for subnormal workers. If the outdoor occupations referred to in your article were combined with the special domestic industries recommended by this Bureau, which are adaptable to the various types of disablement, there is every reason to expect that our main difficulties in the re-establishment of these men and their families would be solved. We should also, incidentally, revive the former union between agriculture and industry, the breaking of which has entailed so much loss to our countryside and to the national health. These views have not met with serious opposition from any quarter, but little has been done to set the good work on foot. We still lack a demonstration-centre in which the new methods are applied, scientifically and upon an economic basis, to the varied necessities of subnormal workers.

The temporary work of "treatment and training" of the less seriously injured, which was the first and immediate object of the Enham Village Centre, is now, four years after the war, at an end. The more difficult and individual task of providing the permanently injured (and the tuberculous also) with appropriate sheltered and assisted work remains to be taken in hand. It requires much new and special knowledge, such as that possessed on the technical and economic side by the Intelligence Bureau to which I have referred, together with skilled supervision. A demonstration-centre on such lines would, in my opinion, be well worthy of public and private support, because it would provide work fitted to the reduced powers of the men we have in mind, because it is economic, enabling them to become with their small pensions partly or wholly self-supporting, and because it would be in connexion with the wider activities of domestic industries throughout the country. If the Enham Village Centre could become such a pioneer demonstration-centre it would do, I think, as great a service as it did in demonstrating the unrealised merits of combined treatment and training. As its cordial well-wisher, no one would be more glad and satisfied than myself to see it, with its thousand acres, give a lead in the solution of this national problem.

I am, Sir, yours faithfully,

R. FORTESCUE FOX.

Devonshire-place, W., Sept. 25th, 1922.

*** We learn with satisfaction that there is a prospect of development at Enham on these lines.—ED. L.

THE MECHANISM OF THE COCHLEA.

To the Editor of THE LANCET.

SIR,—A leading article with this title in your issue of Sept. 30th gives an account of Mr. George Wilkinson's demonstration before the recent meeting of the British Association, in which he explained some of the difficulties in the Helmholtz theory of resonance. It is, however, not difficult to prove that the theory itself is contrary to fact. Any resonating body, a cavity or a string, gives out its own tone when aroused by a single blow or vibration. If the finger be snapped out of a bottle, or a string be plucked, the bottle or the string will respond with its own tone. This phenomenon is known to physics and mathematics as free vibration. If this blow or vibration is regularly repeated, then after two or three such blows or vibrations the resonating body will respond loudly, if its own period of free vibration coincides exactly or very nearly to the period at which the blows or vibrations are repeated. But if the natural period of the resonating body does not agree with that of the arousing blows or vibrations, then it is silent. This phenomenon is known as forced vibration. The elementary statements are to be found in books on acoustics and the mathematical treatment in works such as Rayleigh's "Theory of Sound."

The voice in speech emits a series of blows of air (puffs) or vibrations which never come at regular intervals. The voice is always rising or falling, and each blow comes after a period longer or shorter than that between the two preceding blows. The first blow of a vowel sets all the "resonators," if there be such, in action, each giving its own free vibration. The second blow likewise starts them going. If the third and following blows came at the same interval apart, as they do from a tuning fork, we might suppose that after two or three blows all the free vibrations, except those of the resonator of the same period, would be killed, while those of this resonator would become very strong. But in speech the third blow never comes at the same interval, and the fourth and

the fifth, and so on, never agree with those that go before it. There is nothing to kill off the free vibrations of the whole lot, started each time, and nothing to agree with the period of any one resonator. A vowel in speech would at each instant set all the "resonators" in action and would favour none. A vowel sung against piano strings sets a series of them in vibration, but a vowel spoken against them sets them all more or less in action.

These facts are well illustrated by an apparatus devised by Dr. H. Hartridge of Cambridge. A series of weights are hung by threads from a bar. A single movement imparted to this bar sets all the pendulums in vibration. A regularly repeated movement starts them all, but soon kills off all but the corresponding one. These objections to the Helmholtz theory I have stated in *Nature* (April 22nd, 1922, p. 518), and a picture of Dr. Hartridge's apparatus was given in *Nature* (May 20th, 1922, p. 649).

I am, Sir, yours faithfully,

E. W. SCRIPTURE.

New Cavendish-street, W., Sept. 29th, 1922.

DRIED MILK IN INFANTILE SCURVY.

To the Editor of THE LANCET.

SIR,—In a lecture delivered at the Hospital for Sick Children, Great Ormond-street, and published in THE LANCET of Sept. 9th, Dr. J. H. Thursfield says:—

> It is still disputed by some authorities whether the preparation of the various forms of dried milk leads to the destruction of the vitamins, though to us clinicians the practical proof of their destruction is frequently obvious. In all but one of the cases of infantile scurvy which I have seen since the end of the war, the diet on which the victims had been nourished was a well-known and extensively advertised form of dried milk.

His experience is at variance with that of many other physicians. My own attention was especially drawn to dried milk when I was in charge of Government laboratories as far back as 1910, when I carried out a series of analyses and experiments on behalf of the Government of India. As the result of my investigations I not only advocated the adoption of dried milk for military purposes, but formed such a favourable impression of the product, that I have ever since strongly advocated its adoption as a substitute for cow's milk in infant feeding. The evidence of infant welfare clinics is unanimous as to the absence of scurvy on a diet of dried milk. At the Birmingham Congress of the Royal Sanitary Institute in 1920 I read a paper on the subject which was discussed by a representative gathering of medical officers of health, all of whom were agreed that they had never seen a case of infantile scurvy in a child fed on dried milk, and my own experience both in the tropics and at home supports this view.

In my practice dried milk has been of special value to infants among the poorer classes who have been doing badly. I have used dried milk with success in several cases of persistent vomiting, and have seen a rickety infant steadily improve on it. Drs. Miele and du Quesne recently reported to the Congrès National de Laiterie remarkable results from feeding atrophic children on dried milk; in pure atrophy cure was assured in six weeks, provided careful supervision was exercised. I think I have said enough to show that Dr. Thursfield's experience has been unfortunate, and I venture to refer him to the reports of Hart, Steenbock, and Ellis of recent work at the University of Wisconsin, published in the *Journal of Bio-Chemistry*, 1921, xlvi., 309.

I suggest that the cases at Great Ormond-street may have been due to the use either of faulty preparations or of defective or aged samples, such as were on the market after the war. No clinician claims that dried milk is a solution of all difficulties of infant feeding; but where, as so often happens, pure cow's milk is not available, it is, I confidently submit, the most reliable substitute in the hand-feeding of infants.

I am, Sir, yours faithfully,

R. J. BLACKHAM, M.D., M.R.C.P. Edin.,

Folkestone, Sept. 28th, 1922. D.P.H. Lond.

THE FIBROID DIATHESIS.

To the Editor of THE LANCET.

SIR,—In the course of a very interesting lecture—reported in THE LANCET of Sept. 30th (p. 702)—Prof. E. S. Reynolds asks whether it is possible to include chronic enlargement of the prostate and excessive stricture of the urethra occurring after gonorrhœa as evidence of the fibrous diathesis. On urethroscoping thousands of cases of gonorrhœa, my experience has been that there is always a certain amount of infiltration, but in some the amount is out of all proportion to the inflammation present, severe fibrous contraction taking place. It has been observed that in the black races severe stricture always takes place after an attack of gonorrhœa, while in my observation the prostate is always involved, more or less, during an attack of gonorrhœa; in some there is a large amount of pus formation and in others a slow fibrous change takes place. This might be explained by tissue immunity on the one hand, or a low grade of virulence of the gonococcus on the other, but I am inclined to accept Prof. Reynolds's view. For these reasons I recently emphasised[1] the necessity for dilatation of the urethra and massage of the prostate after every case of gonorrhœa.—I am, Sir, yours faithfully,

Harley-street, W., Sept. 30th, 1922. M. W. BROWDY.

HAS CANCER A PIGMENTARY ORIGIN?

To the Editor of THE LANCET.

SIR,—In his paper with this title, published in THE LANCET of Sept. 23rd, Sir George Beatson raises many interesting points concerning the inter-relation of various organs. The last paragraph of his article encourages me to send this note of certain results I have recently obtained experimentally. Under the influence of inoculation with suprarenal hormones, white rats showed marked increase of fat formation, degeneration of reproductive organs, and invasion of lymph and hæmolymph glands by proliferating cells of epithelial type. When the preparation used contained adrenalin there was in addition to the changes mentioned above (which are due to the cortical hormones) a marked formation of melanoblast cells, which were found in almost any organ, but in greatest numbers in the hæmolymph and lymph glands. Further, in a case of Addison's disease (the details of which I hope to publish shortly), in addition to diminution of body fat, there was marked increase of melanin pigment, and almost complete atrophy of the testes. What the bearing of these findings may be I do not venture to suggest, but the connexion is interesting in view of the theory put forward by Sir George Beatson.—I am, Sir, yours faithfully,

EVELYN E. HEWER, D.Sc.

London (R.F.H.) School of Medicine for Women, Sept. 27th, 1922.

[1] Practitioner, October, 1921.

ST. FAITH'S UNION INFIRMARY, NORWICH.—It has been decided by the Board of Guardians, on the advice of the Ministry of Health, to close this institution permanently. The infirmary accommodated about 40 paupers, many of them bedridden. During the war the major part of the premises was utilised for billeting soldiers. Recently a disastrous fire occurred at the infirmary. All the patients were rescued, owing largely to the prompt action of the master, and were removed to the workhouse at Aylsham, eight miles away.

MUNICIPAL GRANTS TO HOSPITALS AT MANCHESTER.—A sum of £6000 is provided in the annual estimates for contributions to hospitals, and will be distributed as follows: Manchester Royal Infirmary, £1500; Manchester Children's Hospital and Dispensary, £300; Ancoats Hospital, £1200; St. Mary's Hospitals, £750; Manchester Royal Eye Hospital, £620; Manchester Hospital for Consumption and Diseases of the Throat and Chest, £200; Hospital for Skin Diseases, £200; Manchester Victoria Memorial Jewish Hospital, £150; Northern Hospital, £320; Dental Hospital of Manchester, £150; Manchester Ear Hospital, £200; Hulme Dispensary, £120; St. John's Hospital of Manchester and Salford for the Ear, £50; Chorlton-upon-Medlock Dispensary, £40; Christie (Cancer) Hospital, £200.

Opening of the Medical Schools.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.

ADDRESS BY SIR CLIFFORD ALLBUTT.

WHEN our Dean invited me to visit St. George's to-day, and to deliver the opening address of the session, I put all else aside for this distinction, and for the joy of a return to my old school. I was determined to come, even if this service, as some cynic remarked, took the repulsive form of a duty.

Youth and Age.

My pupilage at St. George's seems to me a very long time ago, so great are the changes in thought and fashion which have since come about; so great also the changes within one's self. I was then, I believe, a well intentioned youth, but crude and rudimentary; now the calendar tells me that, if not correspondingly learned and wise, I am very old indeed, though by some process of deception I conceal it from myself. It is the good fortune of a continual converse and sympathy with generation after generation of young men, such as yourselves, that their teachers are also perennially regenerated, and not allowed to grow old. Besides, every day such new and wonderful things arise that life, however long, seems a perpetual springtime. Still, I find in myself one note of age, a disposition to recall the past, if not to dwell in it. The past had its charms, charms indeed which abide; but it had also its monstrous faults, its ragged shortcomings; it has its harvest for us and its happiness, but likewise its warnings. In those days we were far too easy-going. Life was easier, competition was less; every decent and fairly industrious youth was pretty sure of an opening in life. In medicine especially, university graduates were few—the six of my year made a record in Cambridge—and, if fairly efficient, consulting practices fell to them without any ruffling effort, any call for research, or any decorative specialising.

The Past at St. George's.

In the fifties and sixties of the last century nearly all Oxford and Cambridge men went to St. George's. If this fashion were a little too exclusive, we Georgians will find no fault with that. One or two, it is true, went to St. Bartholomew's; but we looked upon them as marooned. Of late years great buildings have sprung up around St. George's; but in those days this was a rather new quarter. Our apothecary, "old Hammerton," as he was affectionately called—for he was the hospitable owner of a rarely good old sherry—used to speak of shooting snipe on the marshes which lay between St. George's and the Old Chelsea bunhouse. Then came Mr. Cubitt, the builder of Belgravia, who, by the simple device of throwing a few loads of gravel on the fen, was able truthfully to assure his customers that his houses were built on gravel. And even in my day there was still something rural about St. George's; and the ruder medical schools used to declare that St. George's men were wont to dissect in kid gloves, and to walk in the park in frock coats and silk hats. But this, as Artemus Ward says, was "writ sarcastic." However, all this notwithstanding, a new spirit was in the air, and we who came up here from Oxford and Cambridge, though under certain disadvantages, were not a dull nor an idle lot. Our company—*quorum fui pars minima*—consisted of Timothy Holmes, William Ogle (John Ogle had graduated and just been elected assistant physician), John Henry Bridges, W. H. Dickenson, Reginald Thompson, W. B. Cheadle, and myself; a strong gang. Dickenson was already engaged in his well-known researches on renal disease. Bowman had lately revealed the inner structure of the organ, and Dickenson's rooms in Caius generally savoured of a combination of tobacco and boiled kidney. Dickenson had been at St. George's before coming up to Cambridge, and was kept supplied thence with diseased renal fragments which, before more effectual methods came into use, were hardened for section by boiling. The microscope of the day was a tall, handsome, spick and span machine, full of wheels and polished brass, carefully preserved under a large glass dome. Holmes had wandered into surgery, a diversion hardly recognised by the Oxford and Cambridge of the day, which did not even examine us in the subject. William Ogle, a fine scholar, discussed disease *sub specie Aristotelis*, Bridges *sub specie* Comte and Positivism. So we were kept alive.

But of all the men of our period under whose influence at St. George's I then came, I owed most on technical lines to Lockhart Clarke, who had commenced general practice, but happily was still in touch with the hospital and demonstrated to us his methods and his researches in neuro-pathology. With him, personally and by correspondence, I had the privilege of working for some years afterwards. Already Dr. Lee had distinguished St. George's and himself by the superb series of dissections of the nervous system of the uterus, still to be seen, no doubt, upon the shelves of our museum.

As older men and students extraordinary, we from Oxford and Cambridge were supposed not to be so mean as to compete with the ordinary students for resident posts—which was one of the grave disadvantages to which I have alluded—or for hospital prizes; but clinical clerkships were not grudged to us. The four full physicians of that time were Dr. Page, a dignified, reserved, gentlemanlike man who neither created enthusiasm, nor probably entertained any; Dr. Pitman, afterwards the able Registrar of the College of Physicians, who was more apt for affairs than for teaching medicine; to him came next the meteoric Bence Jones, and fourth Dr. Fuller. Fuller was a practical, able, careful and painstaking physician who took from his kinsfolk of the great firm of general practitioners, Fuller and Hammerton, of Piccadilly, a strong bent towards pharmaceutical methods. I was Fuller's clerk for three or four months, and learned much of an empirical sort from him; and, moreover, the methods of minute diagnosis of disease of the chest, then comparatively new. After a thorough examination of the patient, Fuller would draw himself up, extract a handsome gold pen from his pocket, dip it cautiously into the inkpot and recite, as he wrote down in a fine hand, an imposing prescription for a mixture of many drugs; and then another for a no less universal pill. Then came the diet and the alcohol. Every patient at St. George's had his liquor as a routine, his four or six ounces of port or sherry (often a good deal more), when in peril of death a liberal ration of brandy, and when convalescent his ale. The cellars of the hospital at that day were filled with wines and brandy by the hogshead, and with ales by the tun. We never heard of anything so vulgar as whisky. Fuller was not a genius by any means, but he was a kindly, competent, and diligent man, and a fair teacher of whom I retain a grateful memory.

A Brilliant Biochemist.

I have passed by, for a few minutes, the brilliant Bence Jones, one so brilliant that I have waited a while to give him his due place. Of his pioneer work in biochemistry it is not my purpose, and hardly within my competency, to speak. Clinical teacher he was not, he did not pretend to be. For this reason, and because of his scandalous unpunctuality, there was no competition for his clerkship; so I was left to hold the post, save for my Fuller interlude, during all the rest of my time at St. George's. Bence Jones told me again and again I was a fool for this continuous attachment to him, and so perhaps I was; but the man was fascinating, and from his brilliant personality one gained much inspiration. As I used to stand waiting at the stairhead, I see him vividly now, bounding up the steps two or three at a time, an hour or an hour and a half too late, the morning's guineas (so men said) scattering out of his pockets as he flew; first appeared the silvery head, then the handsome presence, the sanguine and vivid countenance, the blue eyes; then came the bound towards the beds, and the sharp question—"Which are the worst cases, let me see?"

Next, hasty as it all was, the rapid snatch at my poor notes, the kindly penetrating glance at the patient, the almost magical rapidity of a diagnosis rapped out in half a dozen words, and generally right; then the bedcard, and the scratchy prescription of his invariable pot. nit. and mint water, and the dash on to the next bed. Here perchance arose a conflict of evidence; the bedcard and pen were hurled upon the bed, and we heard the frequent chiding phrase—"Oh! Medical facts! Medical facts! Medical facts!" yet all with a dancing blue eye and a merry, petulant, face.

In therapeutics, or rather in pharmaceutics, Bence Jones was an utter sceptic; or ought I rather to say a cool watcher of unviolated nature? As a biochemist, he believed in nothing he could not separate, test, and measure. Empirical experience, tradition, authority, routine, he disregarded or scorned. *Medical* facts! *Medical* facts! was his continual jibe. Extravagant, even whimsical, as all this was, it was nevertheless a sharp and an inspiring discipline at that time. Moreover, there were the happy days when Bence Jones, who was well known among foreign professors, would bring one of them to the wards, when a lively, interesting, and more patient discussion would ensue, to the enjoyment and invaluable experience of his one St. George's disciple. It is hard to conceive a more striking contrast than this between my two teachers; the gentle fertilising rain of Fuller and the sheet lightning of Bence Jones. At last, on one sad day of a new session, sad to me, for I loved the man, he came up the familiar staircase, not swiftly but slowly; and a wistful look upon his handsome face spoke of some tribulation. On reaching England from a Continental tour he had felt short of breath; in a shop in Dover he bought a binaural stethoscope, then a new toy, listened to his own heart, and heard a mitral systolic murmur. It may, perhaps, have been significant of subacute malignant endocarditis; for he did not live long afterwards. He was a noble gentleman: joy be to his soul; peace that eager spirit would not have desired.

Surgery the Salvation of Inner Medicine.

Of the surgeons of St. George's at that day I can say nothing; the physician and the surgeon had *then* little in common. For the Cambridge degree in medicine, surgery was not required, and I hardly ever entered the surgical wards. A year later, in Paris, I found Trousseau doing the ordinary operations on the chest with his own hands, and I became so confident that surgery was an essential part of medicine that I carried Trousseau's methods for thoracic effusions to Leeds. In England the divorce from internal medicine was so complete that pleural effusions then received little operative care. Happily, Roberts of Manchester, a little later, followed on the same path, and the treatment of these cases entered upon a new life. In Leeds, in like manner, Mr. Teale and I began coöperative work on scrofula—then a far more common disease—and in 1877 we described our surgical method, which has since taken a permanent place in the cure. As I have said in my little book on "The Historical Relations of Medicine and Surgery," from the time of Hippocrates surgery has ever been the salvation of inner medicine. In inner medicine physicians have dwelt too much in dogmas, opinions, and speculations; and too often their errors passed undiscovered to the grave: the surgeon, for his good, has had a sharper training on facts; his errors hit him promptly in the face.

The unhappy cross division between medicine and surgery, an unnatural cramping convention handed down to us from the Middle Ages, especially through the formalist University of Paris, a contempt of handicraft as menial, has been a blight upon our profession even until now. For a fully competent specialist, and specialism there must be, to undertake one-half of a case and leave the other half to someone else is absurd. This lesson the gynæcologists, among their other services, have taught us; and the study of diseases in children is reinforcing it. Sir Robert Jones has lately[1] urged the need of a better and closer integration of medicine and surgery. The surgeon, who is making autopsies daily on internal diseases such as gastric ulcer, gallstones, and other abdominal troubles, and so forth, must learn much more of such perversions of living function than the physician, who makes a few necropsies only. The old division must cease, and the specialist take over the entire responsibility for his portion of the body.

[1] Brit. Med. Jour., May 6th, 1922.

Two Promising Methods.

While on the topic of surgery, may I allude to two methods, as yet on trial, which to me seem to hold out bright promises of reward. The first is that of spinal and local anæsthesia. It seems to me that, besides collateral advantages, the cases thus treated make a better and surer recovery. This promise I perceived some while ago in thyroidectomy. The results of this operation, formerly not very cheerful, seemed to me, from the time when the operation was done entirely under local anæsthesia, to have improved remarkably. At the Addenbrooke's Hospital spinal anæsthesia is frequently used for subdiaphragmatic operations; in prostatectomy, for example, my colleagues tell me they are obtaining decidedly better results. I am speaking of ultimate as well as of immediate results. Why should this be? Besides blocking the afferent system, have we forgotten that in throwing the brain out of gear we are depriving the system of supplies from a vast reservoir of energy—as one may say, from a large clump of accumulators? The release of this great potential may be of critical value in the prevention of "shock" in its various degrees, and further in giving the patient so good a start that he makes a better pace all through the course, and even for time to come.

The second method, which seems to give glimpses of success, is that of deep radiotherapy in malignant disease of internal organs. What we heard of its efficacy in the cautious discussion at Glasgow gave us substantial hopes of a remedy for this, the most destructive of human ills; if realised it will be the greatest of all issues from the womb of Medicine.

Scepticism in Medicine.

Under the influence of such men as Bence Jones and, a little later, under Wilks, a strong negative criticism was brought to bear upon Medicine—to some immediate loss it is true, but to its great ultimate benefit. The time was pregnant with new conceptions; Medicine was being transformed by the vast development of the natural sciences. Now, before every revolution, ultimately beneficent as it may be, there is, and must be, a period of destruction—destruction of old standards and old beauties, of old concepts and old routine. The ground must be cleared of antiquated systems and forms as well as of ruins and rubbish. Those who denounce destructive criticism, saying that because it is not constructive it is but a barren strife, are blind to the lessons of history. Not only must destruction make way and light for the new forms, but indeed we have to resign ourselves also to some permanent, or at any rate long persistent, losses. However beneficent a social change may be, a loss of something useful or lovely seems inevitable. The wistful retrospects of those who, nevertheless, are hoping and working in the new order, is no mere sentiment, no feigning; some loss, so far as we can see, is only too real. The hope for the future is that changes hereafter may be not so cataclysmic—may be foreseen better, and better measured and provided for. The conservatives must be more sagacious, the reformers more patient. As we see in other spheres, the most popular sort of reform is that which gives the appearance of activity while remaining stationary. Yet the longer a position is held, the more cataclysmic will be the rupture of the hardened shell, the worse the ravages of the outburst; besides that loss which seems inevitable in all change. In the case of therapeutics, for example, pharmacologists have done much to clear away antiquated methods and remedies, and to purify and direct those that remain; but in the drift of this reform many administrations and combinations of remedies, established on the experience

of generations of men, have slipped out of sight, and may be altogether forgotten. The harvest is multiplied a thousand fold it is true, but in the ingathering not a little is lost. This kind of peril is greatest in the operations of natural science, which has no concern with values; rather, indeed, works for explanation by reduction to lower categories; whereas ethics and the fine arts work for creation in the highest. Unfortunately ethics and science do not prosper hand in hand, or at the same rate. At the present time science has outpaced and gone far ahead of ethics, and is inventing weapons for the hands of nations and individuals who are not fit to be trusted with them.

Medical Education.

Proper as is this occasion to dwell upon medical education, yet I will refrain, as but the other day I have expressed my opinions thereon at some length in the Educational Number of the *British Medical Journal*. There I have urged the need of good general education first, and of a good professional education afterwards; as regards the first need, and of the vexed question of the "classics" as formative means, I will repeat only that if we are to make the best of ourselves we must make ourselves familiar with the best thoughts of gifted peoples. Ignorance of current classical story is excusable if it does not signify an unfamiliarity with the most powerful and the most beautiful ideas of all other nations also. On the use and peril of words and formulas, and generally on literary composition, I will likewise say little, as the third edition of my counsels on this matter will soon issue from the press.

As regards professional education, I will lay stress only upon the interpenetration, interweaving, and mutual reinforcement of all the sciences on which the art of medicine is founded; so that to pass examinations in these, and then, as you proceed to the farther stages of your course, to throw them aside as done with, is to weaken your grip of the whole. As Roger Bacon wrote, about nine centuries ago, "Nam omnes scientiæ sunt annexæ, et mutuis se fovent auxiliis, sicut partes ejusdem totius." The details of these ancillary sciences you are not expected to master, or to remember, but of the main principles you must not be ignorant. It is not unlikely that the complexity of life comes about rather by this interweaving of many simpler processes—of the order of physics, for example, than to a complexity in the sphere of biology itself. Of a complex web the threads may be simple. Moreover, a common cause may run through one or more groups of phenomena. It may well be that all physiological problems will in course of time be expressible and interpretable in terms of physics and chemistry. Students are apt to suppose that physics are applicable to motor and cardiac functions only; yet even here, when demonstrating the functions of a valve of the heart, too often I find my pupils ignorant of the behaviour of a run of water through the domestic tap. Yet the axioms of physics underlie all our physiological conceptions. It is certain that interface actions, surface-tension, osmosis, adsorption, catalysis, and so forth, determine colloidal activity, and, as a friend of mine says, man is but a big jelly. And what I have said of physics applies no less to chemistry. Thus you must learn to regard diseases no longer as "entities" but as phases of biology. Do not, then, regard the journey of your education as a series of stages, each to be left behind as you proceed, but rather as an ascent of a mountain which gives you continually, as you rise, a wider and better view of the whole. We speak of education more technically as that of the candidate for graduation; but we are worth little if we, each and all of us, do not carry our education up to the end of our lives, and even then feel that we are poor scholars. So, with Socrates, let us grow old learning many new things.

Drudgery and Acute Observation.

Your teachers are endeavouring more and more to lead you forward on research lines, to get you to think things out for yourselves, as you proceed. No doubt there is some drudgery to be gone through, and not a little text-book grind; but if you get a mastery of main lines of thought, and visions of leading ideas, you will carry forward the drudgery and the text-books in your stride. Could any subject seem less profitable for the medical student than of the primitive algæ and diatoms? Yet Dr. Hjort and others have shown that this study has thrown a vivid light upon one side of nutrition—that of vitamins, and given us rational and precise reasons for the use of a remedy so important as cod-liver oil, which we have been using with blind empiricism. Or any more wonderful than that the construction of the Panama Canal should have depended upon the curiosity of Manson and Ross about the guts of a mosquito? So the most abstruse researches often prove to be the most profitable. It is helpful both in lightening the work and also in building up the memory, to make your reading run alongside your practice. Read your clinical manual, so far as may be, at the bedside, selecting your chapters as perchance patients come before you. At the same time you can compare your clinical notes of each case with the literary description of the disease, "cherishing the exceptions." And the nearer approach of the biochemist, the pathologist, and the radiologist to the bedside, though not so close as it will be, you will find already most illuminating.

It is often said that in modern medicine instrumental diagnosis is supplanting the direct aid of quickened senses. Some such ill-effect there may be: abdominal diagnosis, for example, may be so short-circuited by radiology and exploratory operations that the eyes and the finger-tips lose their cunning. But, on the contrary, are not the gains of simple acute observation more rather than less since the common use of instruments? May not the sharp attention they require of us even reinforce this faculty? The distinctions between typhoid and typhus fevers lay as clearly open to our remoter ancestors as to our grandfathers. By mere watching, in the Leeds Fever Hospital, I perceived that thrombosis in a limb, then frequent in infectious fevers, did not belong to the more toxic stages, but was an event of early recovery, of the time when the patient begins to throw one leg across the other, or to turn over upon one arm—a mishap which is prevented by proper vigilance. No instrument was needed to discriminate the various clinical characters of the paraplegias or of Graves's disease; had the mind directed it—and this is the condition necessary—the eye was sufficient. I repeat had the mind directed the eye; for in great part we see what we have trained ourselves to see, and lose sight of what we habitually neglect. The ear at the stethoscope is of little use if a trained mind is not behind the ear. Instruments by which knowledge is made more accurate and quantitative make observers more apt to perceive. Those facts are most valuable which are recorded by scientific minds.

The Value of Empiricism.

And it is thus that we may appreciate the value of empiricism in medicine. In practice, and especially in general practice, we have frequently to act beyond our evidence. The practitioner, gaining a half intuitive insight and foresight, works on what are called moral certainties; as a Swiss guide finds his way, he hardly knows how, on a strange mountain. Without *common sense* of this kind in practice we should lose our way again and again; yet in science it is a treacherous ally; its rules are rough rules and in the long run it fails by the accumulation of small errors; indeed, as Stevenson said, common sense means middling action. To become familiar with phrases leads us to assume that we understand their subject-matter, and we assume our hypotheses to be true because they have not been proved to be false. Among phrasemakers the psychologist is supreme; and some reflections upon the so-called "psychology," which with football and prize-fights now occupies society and the newspapers, may be required of me. "Psychology" is a name pertaining to science; and a department of science there is which concerns itself with the phenomena of mind and works on the methods of science; its students—such as

our lamented fellow-worker Dr. Rivers—measure events as they observe them, and upon these measurements they try cautiously to formulate hypotheses. This study is a part, or aspect, of physiology and would be better named *the physiology of mind*. But, on the other hand, by its otiose and empty reiteration, the word psychology is getting wearisome. For the mind of a man we hear of his "psychology"; of the psychology of a crowd, for the temper of it; and so forth; as if for the mere sake of fine language. Nay, what are we to think of eminent physicians who, writing on paranoia, say that "the hypothesis of a physical cause of this malady must be rejected for a mental one" and discuss the mental symptoms of "somatic" or "physical" disease when they presumably mean the mutual reactions between one part of the body and another. Yet this is but an instance of a multitude of like fallacies. Do such writers really suppose that disorders of mind are unaccompanied with, or do not indeed consist in physical deviations, molecular or massive, within the substance of the brain? The popular psychology of the day is an eminent instance of false science; of the mischief of borrowing the terms of science for talk about notions which do not answer to the requirements of science. The so-called "psycho-analysis" has no units, no measurements and no way to any, no controls, no precise definitions, no separation of objective from subjective evidence. These talkers may be working in the sphere of philosophy, metaphysics, ethics, statecraft, or what other great subject you will, but they are not in the field of science: and to pretend that their matter is science is to strain language and to deceive ourselves. From a sham sociology there may be some benefit as a vaccine or antigen to call forth the protective forces of a nation against infection; if sham psychology has some indirect virtue, as yet it is hidden from us. It is one of the misfortunes of science, as it is of social adventure, that every new point of view, as soon as revealed but in part, is mobbed by a crowd of half-educated thinkers, among whom fanatics and impostors find many dupes. Nay, even pickpockets are now appealing to their judges to regard their cases from the "psychological point of view."

Two Kinds of Adaptation.

It is the fashion at present to be analysing everything; and so often to forget that science has no concern with values; it is quite ready to analyse a dungheap. Moreover, its method is to work upon lower categories, and not to explain anything by a higher category before the lower are exhausted. The method of ethics, the estimation of values, is almost contrary. A common medical catchphrase of the day is that the individual is to adapt himself to his world; but is it not at least as much our duty to adapt our worlds to ourselves? In any case let us strive for the more arduous, not for the most comfortable, adaptations. This "psycho-analysis" is no new thing. For many a century it has been known to the churches, both in practice and theory, as confession and casuistry. The one implies the other. And, broadly speaking, beneficent as may have been, and still may be, its value in particular cases, give passion a vent and the tension falls, yet on the whole, and as a system, it has been condemned by the honour, good feeling, purity, and common sense of mankind. Even Protagoras gave warning of the danger of entrusting one's soul to the care of another; and the Roman Church, well aware of these dangers, has always taken the utmost care to ensure the selection of the director, a peculiarly strict training in casuistry, and withdrawal of the director out of the sight of the pupil. And, happily, by an instinctive perception of self-respect, and by possession of the individual soul, these conversations, for the most part, become diluted on both sides into formulas. Yet, after all this experience, it is now proposed to turn any teacher, or incidental doctor, who has a fancy for the job, to probe into the minds of adolescents and even of children, and this too often with dirty tools. It is false to argue that our souls need not be tainted by foul suggestions, whether in reading or speech. To talk about such things as should not be known, nor "even named, among us" is, as in the divorce court, to create familiarities which breed temptation. To this evil we have daily witness, and it is the very method of "suggestion." But suggestion does not consist, as people seem to suppose, in timely jabs at the mind; incessantly we live in and by suggestion, inward and outward, as we live in air. Was not the ancient Rhodian and Roman Stoicism, austere as it was, yet more dignified, more reticent, more respectful of the individual soul, than the psycho-therapism of to-day? It will be said, "Look at the marvels of restoration achieved by the psycho-therapist!" We can only answer to our patients, as Gull answered a similar appeal—Yes; Go; but mind you go while it is curing. Again, the falsity of arguing of mind as something other than body, or superadded to it, of dividing "somatic" from mental operations, is well illustrated by the recent appreciations of hormones. In the July number of *Mental Hygiene* is an amusing article on this subject by Dr. Bond, of the neurological department of the Pennsylvania Hospital; who explains how to regulate the family, or even wider, circles, by the judicious administration of glandular extracts; he suggests that these, being calculable to the thousandth part of a cubic centimetre, might be happily used to adapt individuals to conformable standards. Thus, if John persistently comes late to school, give him pituitary; if Aunt Sally helps the family with an unselfishness which at times is hard to bear, well submit her to glandular therapy and give of her altruistic superfluity to the daughter, who buzzes in and out of the house, vigorous, bossy, irritable, talented, but balks successively at all useful vocations. Dr. Bond quotes Cushing's prescription—"Have Alice nibble from a pituitary mushroom in her left hand and a lutein one in her right, and Presto! she is any height desired." But, says Dr. Bond, don't overdo it; lest too large a dose might rouse a religion which occupied itself in "hunting the scriptures for things you mustn't do," or, we might add, a patriotism which Samuel Johnson said was the last refuge of a scoundrel.

And as to dreams; is it unfair to say that the interpretations given by psycho-analysts to the dreams of our modern Jacobs and Daniels are incredible nonsense? Surely these divinations are worse than unsubstantial or extravagant! In the lack of precise definitions, what is formulated as the "subconscious" cannot contain more than the records of past and so far inferior experience; indeed the conscious merges so gradually, and with so many ebbs and flows, into habit and automatism that the very distinction is a vague one; anyhow we cannot get more out of a pot than has been put into it. Complete sleep is dreamless; dream is the awakening of the brain by parts; could we see the brain we should probably perceive faint blushes wafting here and there, stirrings dependent on incidental influences. Conversely, we often become aware of the falling of portions of our brain into sleep; when we see the tea being poured out of a vineleaf we know that the rest of our brain will soon drop into slumber. Healthy young people fall asleep and awake at once; others awake and fall asleep by bits, as an irritant from the stomach, or a defect in an arterial twig may determine; or again as a self-torturing worry denies sleep to its central seat. But in these dreamy fluctuations of cerebral tides and bays there are no divinations or moral revelations, nor resurrections from prophetic depths of the cerebral cell. They are responses to cutaneous or visceral stimulants, or signify some intrinsic change such as a local arterio-sclerosis.

Conclusion.

And now in conclusion may I give you a few counsels on the ethics of our professional life, and on the spirit in which you are to walk? Every profession has its hardships and its rewards, its rough places and its smooth, its joys and its drudgeries; and Medicine is not outside, nor above the common lot. But in Medicine the trials and the blessings come close

together. In all honest work there is ultimate good, but in Medicine the rewards of devotion, of forgetting self in helping the sick and sorrowful, are more immediate; the harvest is gathered on the field. The sense of saving life, or of relieving pain, as promptly as by dragging a drowning man out of the water, is joyful; little grateful as the saved one may be. It is perhaps no less a satisfaction to feel that at least we smooth the pillows and calm the fears of the suffering. And if, in the course of years, these benefits may seem to have been disregarded, and in particular cases they may have been, or if, after our English fashion, thankful friends have kept an inscrutable silence, yet, sooner or later, on some sudden occasion perhaps, their hearts will be opened, and the kindly and skilful physician will find to his comfort that the tokens of the grateful affection of his patients and their friends are poured into his bosom, often from unexpected quarters, in full measure and running over.

A successful physician once told me that he never left a house without giving a favourable prognosis; a counsel which had perhaps a colour of worldly wisdom about it; but this far he was right—that we cannot foresee what benediction words of hope may bestow. I have told a story elsewhere of one who asked his doctor what boon he supposed to be most desired of him by his patients? Was it diagnosis, or medicines, or skill, or kindly counsel? No! none of these was the most precious: what the patient yearned for, the remedy to put the most heart into him, was Hope. *Vivere spe vidi qui moriturus erat.*

If we say, or think, that God's will be done, let us anxiously remember that if these words are said in a fatalistic spirit and with folded arms, they are evil. God's will is to be read in His laws, the laws of nature as of spirit; and it is not until we are sure that we have done our best to learn these laws, and to use them efficiently, that we shall have any right to be content with the sigh of resignation. It is *not* God's will that evil and adversity should come or abide, but that with Him we should work for every possible means of defeating them. You are to find your life by losing it in the beneficent work of your calling; beneficent not in kindliness only but also in the full command of the scientific knowledge available in your day.

LONDON (R.F.H.) SCHOOL OF MEDICINE FOR WOMEN.

THE inaugural address of the session 1922 of this school was given on Oct. 2nd by Lord BURNHAM. The Dean, Miss L. ALDRICH-BLAKE, who presided, having welcomed the new students, Lord Burnham congratulated the school on its achievements in the past and considered that additional cause for congratulation lay in the fact that the school buildings were situated in the centre of the area allocated to the University of London. He looked forward to the day when the University of London would be a truly Imperial University, a centre of learning and research to which would resort not only members of England's dominions over the seas, but also of all the English-speaking races. Lord Burnham referred to the history of the school, speaking of those pioneers who, by their indomitable courage, won for themselves and their fellow women the right to enter the great army of healers. They had, perhaps, never received due acknowledgement from the nation, but their lives remained an inspiration to others. He spoke of the various branches of medicine in which women might successfully engage, mentioning inter alia, the public health service and the hitherto but little trodden paths of pathology, bacteriology, and electro-therapeutics. Lord Burnham reminded the students who listened to him of the need to reconcile their high ideals with work that might seem at times repellent, and said that in the profession which they hoped to enter nothing was common or unclean but slipshod methods and a dishonest pretence to understand what was not really understood. He ended with an exhortation to the new students not to lose their first enthusiasm in the years of exacting work before them, and he pointed out that efficiency in all things was essential in the pursuit of such a study as medicine.

MRS. SCHARLIEB, M.D., then rose to propose a vote of thanks in a stimulating speech. She said that while the work done by the students in the school was of a high order, many distinctions being gained and a high academic standard being reached, she yet felt that women had so far failed to produce any one work of lasting value. She thought the time had come for the appearance of some great book or important discovery, and she urged the need for greater enthusiasm for research and original work.

MIDDLESEX HOSPITAL MEDICAL SCHOOL.

AT the opening of this school on Oct. 3rd Prof. S. RUSS gave an address. He said: In thinking how I could speak upon some subject which would be of general interest and yet of scientific aspect, it occurred to me that parts of the life work of two great English medical men might not be inappropriate. I propose in a brief historical sketch to speak of two medical men who made epoch-making discoveries in physics, William Gilbert and Thomas Young.

William Gilbert.

William Gilbert was born in 1540, the son of a Suffolk gentleman, the Recorder of Colchester. During the greater part of his life he was making experiments and observations upon magnetism, the collection of which he embodied in the celebrated "de Magnete," published in London in 1600, three years before he died. This book marks the beginning of the scientific study of magnetism, and contains a mass of experimental work which resulted in Gilbert's great discovery that the earth behaves as if it were one vast magnet. Gilbert spared himself no trouble either in finding out what other experimenters had discovered, or in trouncing soundly the baseless statements of those whom he dubs the raw smatterers and copyists. His first observations were very naturally directed to the study of the properties of the natural magnetic substance known as lodestone, distributed very generally over the earth's surface. Gilbert found little in the work of his forerunners to help him in his experimental researches, but much in their writings to make him despair of his conclusions being accepted, for the literature of his time teems with speculation and not a little nonsense. Finding the lodestone possessed of magnetic properties causing it to respond to some hidden and obscure force, the tendency had been very general to endow it with many other mystic qualities. The fact that iron could be magnetised by contact with a lodestone had been known for a very long time, but the cause which made a magnet take up a definite position when suitably suspended remained obscure, until Gilbert proved that it was due to the directive action of the earth acting as a magnet. Here again speculation was rife. One suggestion was that there was magnet-stone situated under the tail of the Great Bear which directed magnets on the earth, another favoured the planet Saturn in this capacity, another Mars. One, Martin Cortes, finding no cause in the whole of nature which would satisfy him, considered that there was a point beyond the heavens which attracted iron.

Important as Gilbert's discoveries in magnetism were from the purely physical point of view, they were of great significance in the science of navigation. The use of the compass was known before Gilbert's time, though the reason for its behaviour was obscure, and it was no small part of Gilbert's work in this connexion to form some idea of the differences in the readings of the compass in the different oceans. Here he was dependent largely for his data upon the rather

rough and ready methods employed by the navigators of his day.

Nothing better illustrates the pleasure which Gilbert derived from knowing his experiments to be of use than his expressed gratification at the benefits which seamen were to derive from the use of his nautical instruments. By observations of the variation and the declination of the magnetic needle he saw the possibility of fixing the position of a ship at sea by magnetic observations alone. Owing to the fact that to each latitude there does not correspond a constant dip, his hope has remained unfulfilled, and the charting of the seas for the magnetic irregularities which exist throughout them is a work which continues to the present day. Gilbert's electrical discoveries were quite important and include the observation that glowing bodies and flames dispel the electrical charge in other bodies, and that the attraction of an electric is in a straight line toward it. He was the inventor of an electroscope which was the forerunner of the delicate instruments of the present day.

Thomas Young.

I pass now to a few remarks upon the physical researches of a most amazing man, Thomas Young, born in 1773, son of a man of some property in the west of England. Young was an intellectual giant, was a Fellow of the Royal Society when he was 21, and was known among his university colleagues as "Phenomenon Young." Besides being the founder of physiological optics his experiments upon the nature of light mark a most important epoch in the history of the subject; for they clinched the argument once and for all for the wave theory of Huygens as against the corpuscular theory of the great Newton. Young's experiments were sufficiently decisive for him to state that "radiant light consists of undulations of the luminiferous ether." Even at the present time, when the existence of the ether itself is questioned, the importance of Young's discovery remains undiminished. It was as the outcome of his work and that of Fresnol that a theory of the nature of light evolved, which, in the hands of Clark Maxwell, led to the most brilliant generalisation of the last century—namely, the electro-magnetic theory of light. Young's work upon the elasticity of solids and upon the cohesion of liquids remains good to the present day. Young had the reputation as a lecturer of being very obscure. It is recorded that two courses of lectures delivered at the Middlesex Hospital were but sparsely attended!

Physics and Medicine.

The discoveries of both these men mark epochs in the history of physical science. Gilbert rescued the subject of magnetism from a state of hopeless chaos and confusion, and put its study upon a firm experimental basis, while Young's discoveries led up to the generalisations of Maxwell and the study of radiology in its widest sense.

A word of reassurance may be directed to those at the start of their medical studies and for whose welcome these gatherings are especially designed. The discoveries in physics of two men devoted to the practice of medicine did not prevent them from succeeding in their profession. Gilbert having graduated in arts and medicine at Cambridge some years later settled in practice in London. Success in no ordinary measure came to him here, for he became physician to Queen Elizabeth, and afterwards to King James I. He also became a Fellow and subsequently Censor, Treasurer, and finally President of the College of Physicians. Thomas Young received his medical education at Cambridge, St. Bartholomew's Hospital, and Göttingen. He practised in Welbeck-street, became a Fellow of the College of Physicians in 1809, acted as Censor for the College during two years, and became one of the physicians to St. George's Hospital. His methods as a physician were not the vigorous measures of his day, yet we can fairly assume that he did not lack patients.

KING'S COLLEGE MEDICAL SCHOOL.

THE opening of the winter session took place on Oct. 3rd, when Sir HERBERT JACKSON gave the inaugural address. He said: During the last few years a good deal has been heard of the neglect of science in early education, and no one who has followed the discussions which have taken place on the subject can doubt that there was good reason for striving after reform in the direction of giving much more attention in schools to the broad general principles of science. It is always difficult for the advocates of reform to avoid exaggeration, and in some minds there is a feeling of the possible danger that in remedying a neglect of science in early education there may be too much of a tendency to bring about neglect of the study of the humanities. I would endeavour to emphasise that possibly to no members of the community more than to those who intend to follow the medical profession is breadth of early education more important.

Value of Early Education.

Some of the great men in the medical profession in the past owed to the education they had in humanities in their early school days, to the wide outlook in science which was given to them in their early professional education, and to their ability to see medicine more or less as a whole, much of the power and influence which they exerted, not only in their profession but also as citizens, because of what was called their "individuality." Limitation to the study of so impersonal a subject as science is hardly likely in itself to be the best training for an individual in powers of expression and communication of his feelings, and it would appear, therefore, to be clear that the inclusion of the subjects grouped together under the term "humanities" is vital in the education of one who enters into such intimate relations with his fellow creatures as does a medical man.

As to his scientific education, it is admittedly impossible now for anyone to have so comprehensive a knowledge of medical science and all the collateral sciences as was possible in earlier years. But the labours of those who have been bringing the sciences more and more together, and pointing out the great similarity in their underlying principles, have made it possible for the present and future students of medicine to acquire so wide and sympathetic an outlook that they will have practically the same kind of mental attitude towards their fellow creatures and their other surroundings as their predecessors had. While acquiring more profound and detailed knowledge of the special branch which they may elect to follow, they will still be capable of feeling and showing that general sympathy with human activities which appears to be a necessary equipment if a man is to influence others. The outlook on science changes so rapidly, and the applications come one after the other so quickly, that it does seem as if a much sounder and more comprehensive early study of general principles throughout the sciences would be the best means of ensuring that, in later life, a medical man would not have to learn anew what he had passed over, but being familiar with it could build upon it at once. I can imagine that even perhaps at the present day—at all events a year or two ago—a lecturer enlarging much to medical students on certain branches of physics and chemistry would possibly meet with a certain measure of inattention. If, for a moment, however, I may call your attention to what appears to be a most inspiring outlook from particular work on crystals, I think you will see the relevancy of the suggestion that the students' time was not being wasted.

Possibilities of Chemistry and Physics.

From work on the structure of crystals there has arisen the notion, described at the last meeting of the British Association by its author, Sir William Bragg, of crystal units which may consist of two, three, or more molecules, or perhaps in some cases of only

one molecule. The interpretation by the results of X rays of the structure of these crystal units in space of three dimensions promises to yield more and more perfect knowledge of the physical properties of matter in the gross, since it is evident that these physical properties are nearly all implicit in and traceable to the crystal unit itself. We have, therefore, a new conception of a physical reality in the shape of a unit from which existing properties of crystalline matter can be deduced, facts about it can be more closely related, and possibilities more reasonably predicted than could be done with any of the earlier configurations of the molecule familiar to the chemist.

Again, there is the wonderful development which may be very briefly described as the progressive use of light of shorter and shorter wave length. Where the microscope fails, even with ultra-violet light, to reveal structure and the nature of structure, the shorter wave lengths continue the story right down to the very molecules and atoms, so that we seem almost now to be able to see them—at least, we can see models of them which are based on very sound observations and deductions. I have chosen this illustration because these things might perhaps not be of special interest to medical students; but if further development of all this work with the utilisation of a larger range of short wave lengths carries the investigations from crystals to all such substances as cellulose, horn, tendon or muscle, which have definite structure, there can be no question that the time will come when it will all be a matter of profound interest to medical men.

I need do no more than mention to this audience the great developments that are taking place in psychology, in physiology, in other departments of biology and in biological chemistry; and on this occasion—the commencement of a session—I feel that one may indeed congratulate those who are entering on the study for their profession that they are doing so at a period when there has probably never been a feeling of greater hope of wonderful new discoveries or greater enthusiasm exhibited in the search for them.

Obituary.

ANNE FENTON CLEAVER, L.R.C.P. EDIN., D.P.H. CAMB.

Dr. Anne F. Cleaver, Assistant Medical Inspector of Schools under the Transvaal Education Department, died at Johannesburg on Sept. 4th. She was a member of a well-known Orange Free State family, and had been a hospital nurse before qualifying L.R.C.P., L.R.C.S. Edin., and L.R.F.P.S. Glasg. from the London (R.F.H.) School of Medicine for Women. In 1903 she held an appointment as senior house surgeon at the Clapham Maternity Hospital, and then, taking up public health work, she proceeded to University College and took the D.P.H. Camb. in 1904. A year later she returned to South Africa and started private practice at Johannesburg. She felt a keen interest in public affairs, and was appointed one of the members of the first school board on the Rand, in which capacity she did excellent service. In 1915 she was appointed assistant medical inspector of schools, in charge of the Witwatersrand area, a position which she held up to the time of her death. In addition she was departmental examiner in physiology and hygiene, and director of the new school clinic, an institution which practically owes its existence to her insistence on the necessity of following up and treating defective school-children.

Dr. C. Louis Leipoldt, Chief Medical Inspector of Schools, Transvaal Education Department, writes: "Through the death of Dr. Cleaver the department loses a conscientious and highly capable official, to whose energetic efforts the success of school medical inspection in the Transvaal is largely due. Her personal charm and large heartedness endeared her to all who had to work with her, and her popularity, both as an inspector and as a lecturer, made her a very welcome visitor in all the schools under her charge. She did excellent pioneer service, especially in regard to the investigation of malaria, ankylostomiasis, and bilharziasis in the low veld. The malarial survey of our schools was started when she entered the service in 1915, and she was responsible for the investigation of the disease in the Rustenburg and Pietersburg areas—a work that entailed travelling on an average 1200 miles by motor car per month, camping on the veld, and exposure to considerable danger of infection. The results of her inquiry are collated in the report on malaria published in 1920; the results of her investigations into bilharzia and ankylostomiasis still await publication. Her contributions to the medical journals were few, and owing to her diffidence in publishing the results of her work the data she accumulated on such interesting subjects as the onset of puberty in South African girls—an investigation which she started as soon as she became medical inspector—the incidence of rheumatic fever in Transvaal children, and the association between rheumatic fever and chronic malaria have not yet appeared. She took a broad view of the possibilities of medical inspection of schools, especially in connexion with the prevention of defects by ante-natal effort and by vigorous propaganda work. At the school clinic—a fine institution which she had helped to plan and which she had been largely instrumental in establishing while I was absent in the Cape Province—she instituted a modern, up-to-date ante-natal clinic (a feature of which was the systematic routine blood testing of every patient), besides devoting every Saturday morning to the treatment of minor ailments, and latterly, every Wednesday to ionisation treatment of children suffering from otorrhœa. As a colleague she was keenly interested in the development of the service, and indefatigable in her efforts to cope with an enormous area with its 1500 scattered schools. Her death is a great loss to us and to the service, for she was an ideal medical inspector, and a pioneer whose record is an inspiration for those who will have to follow her."

THOMAS DAVEY LUKE, M.D.R.U.I., F.R.C.S. EDIN.

Dr. T. D. Luke, who died on Sept. 25th at the age of 49, was well known in the West of England for his interest in hydrotherapy. He studied medicine at Belfast, Dublin, London, and Edinburgh, and graduated M.B. at the Royal University of Ireland in 1894. In 1902 he took the F.R.C.S. Edin. and six years later proceeded to the M.D.R.U.I. His first interest after qualification was anæsthetics. He was appointed lecturer in anæsthetics in Edinburgh University and later wrote a Guide to Anæsthetics, and, in conjunction with J. S. Ross, Anæsthesia in Dental Surgery, which has gone through four editions. He soon became interested in hydrotherapy and he was made resident physician successively at Smedley's Hydro at Matlock, at the hydro at Grange-over-Sands, and at Peebles Hydro. Later he became medical director of the Ochil Hills Sanatorium at Kinross. Dr. Luke wrote the article on Hydropathic Treatment in Osler and Murphy's Encyclopædia of Medicine and several other publications on his special subject, including a Guide to British Health Resorts, which appeared in 1919. His last work, a Manual of Physio-Therapeutics, described a number of methods of treatment not employed as they might be by medical men generally. He had exceptional opportunities for the study of physical agents and did much to popularise them.

CARNEGIE HERO FUND.—A medallion has been awarded to Dr. J. W. L. Spence, also an annuity of £130, in recognition of his valuable work in electro-medical research and radiology. Dr. Spence, in spite of an amputation of his right forearm necessitated by X ray dermatitis, still carries on his work as medical officer in charge of the electrical department of the Royal Hospital for Sick Children, Edinburgh, and radiologist to other institutions.

Medical News.

LONDON SCHOOL OF TROPICAL MEDICINE.—The annual dinner will be held at the Trocadero Restaurant, London, W., on Nov. 1st, at 7.30 P.M., Dr. Hugh S. Stannus presiding.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The opening lecture of the winter session will be given by Sir James Galloway at 1, Wimpole-street, London, W. 1, on Oct. 11th, at 5 P.M., the subject being Hodgkin's Disease and Similar Unexplained Maladies. The chair will be taken by Sir George H. Makins. The lecture is open to all members of the profession.

ROYAL SANITARY INSTITUTE.—A sessional meeting will be held on Oct. 13th and 14th in the City Hall, Cardiff, when a discussion on Health Education of Children will be opened by Dr. J. S. Peebles and one on Open Air Schools by Mr. E. E. Morgan. The chair will be taken at 4.30 P.M. by Dr. Louis C. Parkes. The discussions will be preceded at 3 P.M. on Oct. 13th by a demonstration in the National Museum of Wales, by Dr. J. J. Simpson, of models and slides of flies, mosquitoes, and parasites. On Oct. 14th, at 10 A.M., visits will be paid to several small Glamorgan Council schools, and the Cardiff housing scheme will be considered.

LONDON HOSPITAL MEDICAL COLLEGE.—The annual dinner for past students of this hospital will be held on Thursday, Oct. 12th, at 7.30 P.M., in the Trocadero Restaurant, London, W. Sir Arthur Keith will preside. The hon. secretaries for the dinner are Mr. H. S. Souttar, C.B.E., and Mr. E. C. Lindsay, C.B.E.

The "Price" Entrance Scholarship in Anatomy and Physiology offered by this College and open to students of the Universities of Oxford and Cambridge has been awarded to Mr. J. Gray of Fitzwilliam Hall, University of Cambridge.

ST. BARTHOLOMEW'S HOSPITAL OLD STUDENTS' DINNER.—About 130 old students attended the anniversary dinner at the Hotel Victoria, London, on Oct. 2nd. Sir Charles O'Brien Harding, who presided, in proposing the toast of "The Hospital," referred, without blushing, to the ubiquity of Bart.'s men in leading professional positions: Bowlby at the College of Surgeons, Rolleston at the College of Physicians, Garrod at Oxford; in his own town of Eastbourne, which was a health resort, the civic medical duties were discharged by an old Bart.'s man, Dr. W. G. Willoughby. He looked forward to the celebration next year of the 800th anniversary of the foundation of the hospital; the next annual dinner, he said, would be arranged to take place during the celebration. Lord Stanmore, treasurer of the hospital, in replying to the toast, reviewed its financial position. Although expenses had more than doubled since before the war (£185,000 as against £91,000 per annum), the deficit during the past year had only been small. They were looking forward to extensive reconstruction, and a feature of the celebration next year was to be an architectural competition, a prize of £1000 being offered for the best plan of rebuilding. Sir William Lawrence, in proposing the toast of "The Medical College," gave it as his opinion that medical education was the paramount function of the hospital. The tendency of country practitioners on confronting a difficult case was to "wrap him in a blanket and send him up to London." Cases admitted should be of a type suitable for teaching purposes. As regards the proposed rebuilding, he hoped no sentimental considerations would be allowed to interfere with the pulling down of old buildings, however pleasant their associations, if their reconstruction was deemed to be necessary. Mr. H. J. Waring, Dean of the Medical College, replying, referred to the growth of the Medical School, in particular to the large entries of students during the past two years. Post-graduate education on any considerable scale had been found to interfere with the proper teaching of students, and had been given up, with the exception of a short summer course for old Bart.'s men. Sir Thomas Horder, who proposed "The Guests," referred to the part played by the headmasters of schools (those of Westminster and Merchant Taylors' were present), in educating future students of the hospital. The Rev. E. C. Pearce, Vice-Chancellor of Cambridge University, felt his presence at the dinner justified by the large number of Cambridge men whose post-graduate education was carried on at Bart.'s, and by another bond which united the two institutions—the fact that neither could find room for the ladies. Sir William Thorburn, of Manchester, who also replied, emphasised the debt owed by medical schools all over the country to the work done in the London schools. Sir Anthony Bowlby, in proposing "The Chairman," described him as one of those men who, by their ability and their personality, carry the fame of a hospital beyond the bounds of its immediate influence.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—Museum demonstrations will be given during October on Fridays and Mondays (beginning, Friday, Oct. 13th) in the Theatre of the College in Lincoln's Inn-fields, by Sir Arthur Keith and Prof. S. G. Shattock. These demonstrations are open to advanced students and medical practitioners. The two first will be on specimens illustrating the effects of castration in man, and specimens illustrating the anatomical results of inflammation.

DUBLIN AND THE VIENNA MEDICAL SOCIETY.—Following on the visit to Dublin last spring of Prof. Frankl of Vienna, the Royal Academy of Medicine in Ireland made a collection among its Fellows and Members in aid of the library of the Medical Society of Vienna. The secretary was enabled to forward the amount of £45 to assist the medical society to keep its library open. At the present rate of exchange this sum has been of real assistance to keep the library supplied with files of modern journals, and the cordial thanks of the Society have been conveyed to the Academy.

PRINCE OF WALES'S GENERAL HOSPITAL AND NORTH-EAST LONDON POST-GRADUATE COLLEGE.—The annual dinner of the Reunion Association will be held at Pagani's Restaurant, Great Portland-street, London, W., on Thursday, Nov. 9th, at 8 P.M., Dr. F. G. Crookshank presiding. The price of tickets will be 12*s.* 6*d.* each (exclusive of wines). All prospective members of this Association are asked to communicate with the Hon. Treasurer, Mr. S. O. Rashbrook, 1, Priory-terrace, Kew, Surrey.

SOCIETY OF M.O.H's.—The annual dinner of the Society will be held at the Hotel Cecil, London, W.C., on Friday, Oct. 20th, at 7.30 P.M., when Sir Alfred Mond, Sir Arthur Robinson, Sir George Newman, Sir Humphry Rolleston, and Sir Anthony Bowlby, among others, are expected to be present. Early notice of intention to attend should be sent to the Executive Secretary, 1, Upper Montague-street, London, W.C. 1.

A meeting of the Metropolitan and Home Counties Sub-Group of the Maternity and Child Welfare Group will be held at 1, Upper Montague-street, London, W.C. 1, on Tuesday, Oct. 10th, at 5.15 P.M., when a paper will be read by Mr. G. E. Waugh, senior surgeon to Great Ormond-street Children's Hospital, on the Prevention and Treatment of Nasal and Aural Infections in Infancy.

ST. MARY'S HOSPITAL ANNUAL DINNER.—This dinner took place on Oct. 2nd at the Connaught Rooms, Holborn, Sir Leonard Rogers presiding. More than 130 past and present students assembled. The chairman, in proposing the toast of St. Mary's Hospital and Medical School, referred to the time when he was a student and later a resident, and expressed his pleasure in being present once again, after so many years abroad, at a St. Mary's function. Mr. Prideaux, chairman of the Board of Management, responded for the hospital, and Dr. C. M. Wilson, dean of the Medical School, outlined various measures already in force and certain other plans still to be completed for improving the efficiency of the teaching and establishing firmly the position of the school as an institution deserving Government aid. The success attending the newly instituted post-graduate course was a gratifying feature, and among the advances he foreshadowed was the attempt which was being made to improve the teaching of midwifery, a subject which had been sadly neglected in the past in most medical schools. The proceedings terminated with the proposal by Sir John Broadbent of the health of the chairman, which was received with acclamation.

WESTMINSTER HOSPITAL: ANNUAL DINNER.—The annual dinner of the past and present students of this hospital was held at the Wharncliffe Rooms, Great Central Hotel, London, W., on Oct. 2nd, Mr. Arthur Evans presiding. Ninety-one were present, the guests including Sir Edward Pearson, Mr. T. F. Squarey, Sir Bertram Jones, Mr. C. M. Power, the Rev. A. E. Hillard, and Mr. Arnold Powell. The toast of the Hospital and Medical School was given by the chairman, Mr. Evans, and responded to by the dean of the Medical School, Dr. A. S. Woodwark, who described the steady progress in the number of students (the present entry being the highest for 15 years) and the large number of academic successes achieved. Mr. Walter Spencer proposed Past and Present Students, in response to which Mr. Rock Carling and Mr. Wilson spoke. Sir James Purves Stewart gave the toast "The Visitors," coupled with the names of the Rev. A. E. Hillard, High Master of St. Paul's School and Mr. Arnold Powell, Headmaster of Epsom College, both of whom in their replies referred to the long and honourable association of their respective schools with Westminster Hospital. "The Chairman" was given by Sir Bryan Donkin, the senior consulting physician. In his response Mr. Evans described some amusing personal experiences when a student under Sir Bryan Donkin's tutelage.

AT 3 A.M. summer time on Sunday, Oct. 8th, the clock will be put back to 2 A.M. Greenwich mean time.

LEEDS GENERAL INFIRMARY.—On Oct. 2nd Princess Mary Viscountess Lascelles opened the new infants' ward, which was erected in commemoration of her marriage. There is accommodation for 14 cots, in addition to administrative offices and the equipment is completely up to date.

HEREFORDSHIRE MEDICAL SOCIETY.—This society has just opened new quarters at 20, East-street, Hereford, and is open to any member of the profession visiting the neighbourhood as well as subscribing members residing in the county. Contributions from authors or others of any modern books to augment the library would be welcomed.

EMERGENCY NIGHT CALLS.—At an inquest held by Dr. Edwin Smith, coroner for Shoreditch, on the body of an old woman whose death was attributed to syncope, the coroner commented on the fact that the surgeries of six medical men had been visited late at night by the deceased's son, who was unable to obtain help from any one of them. The assistant medical officer of Bethnal Green Infirmary, when called in, found the woman dead.

LADIES' MEDICAL GOLFING ASSOCIATION.—The results of the successful meeting held at Oxhey on Oct. 3rd were as follows:—Scratch Prize: Mrs. Hetherington, 84; Captain's Prize: Mrs. McPage, 93 − 12 = 81; Senior Handicap: Mrs. Granger Harrison, 93 − 9 = 84; Mrs. Lewis Smith, 93 − 9 = 84; Junior Handicap: Mrs. Crimp, 106 − 22 = 84; Foursomes against Bogey: Lady Goadby and Mrs. McPage, 1 down.

THE LATE DR. J. H. GOODLIFFE.—Dr. Goodliffe, whose death is reported from Kingston, Jamaica, was at one time deputy principal medical officer of the Uganda Protectorate. He graduated M.B., C.M. at Aberdeen University in 1894 and three years later proceeded to the M.D. degree with honours. For some time he was an assistant medical officer and pathologist at the Lancashire County Asylum and afterwards assistant medical officer at the Berry Wood Asylum. He served with the Ashanti Field Force in 1900–01 as a civil surgeon and received the medal for his services.

HEALTH WEEK.—Health Week, which is to be held from Oct. 8th to 14th, was instituted in 1912 by the Royal Sanitary Institute, under the patronage of their Majesties the King and Queen. The chairman is Sir James Baddeley, Lord Mayor of London. The object of the promoters is to focus public attention on all questions relating to public health, and to arouse a sense of personal responsibility without which the action of government and local authorities must fail. It is hoped that medical officers will make some special effort during Health Week to create a strong public opinion in favour of high health standards. Simple health talks by teachers to their pupils constitute a useful form of propaganda. A large number of municipalities in this country and abroad have undertaken to make a special effort during the week, or to utilise Baby Week to arouse public interest by various forms of appeal.

THE LATE DR. J. S. TEW.—Dr. James Scott Tew, who died at his residence at Tonbridge on Sept. 27th, graduated M.B., B.S. from the University of Durham in 1889, having qualified M.R.C.S. Eng. in 1881. For a time he was assistant demonstrator of anatomy at the Durham College of Medicine and afterwards became medical officer of health for the Basford Rural District. Since 1895 he had been medical officer of health for the West Kent combined sanitary districts. A major in the Territorial Sanitary Service, Dr. Tew was a Fellow of the Society of Medical Officers of Health and had been president of the Home Counties Branch of that Society. He had also been president of the Nottingham Medico-Chirurgical Society and was a Barrister of the Inner Temple.

DONATIONS AND BEQUESTS.—The Manchester Royal Infirmary has received the following legacies: £1126 from the late Thomas Battersby, £1050 from the late Mrs. Eliza Smith, and £900 from the late J. T. Partington, and donations of £500 from the Rev. H. P. V. Nunn, £127 from the Manchester City Football Club, and over £200 from other donors. During the past month the St. Mary's Hospitals, Manchester, have received donations amounting to £1614, including £1265 from the Hospital Sunday Fund and £174 from the Alexandra flower carnival.—The late Mr. John Wells bequeathed £1000 to St. Albans Hospital and Dispensary, and on the death of his wife £5000 to St. Albans Hospital and Dispensary; £2500 to the Hospital for Sick Children, Great Ormond-street; £2000 to St. George's Hospital; and £2000 to St. Mary's Hospital, Paddington.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Monday, Oct. 9th.

WAR: at the Royal Army Medical College, Millbank, S.W. 1.
At 4.30 P.M.
Tea will be served in the Officers' Mess, and visitors will be welcomed whether Members of the Section or not.
At 5 P.M.
Presidential Address by Lieut.-General Sir John Goodwin, A.M.S.
The Laboratories will be open after the Address, when it is hoped to demonstrate some items of interest.

Tuesday, Oct. 10th.

THERAPEUTICS AND PHARMACOLOGY: at 4.30 P.M.
Presidential Address:
Dr. W. Langdon Brown: The Problems of Asthma.
Paper:
Dr. T. Izod Bennett: The Modification of Gastric Function by Means of Drugs.

Thursday, Oct. 12th.

NEUROLOGY: at 8.30 P.M.
Presidential Address:
Dr. Wilfred Harris: Toxic Polyneuritis.

Friday, Oct. 13th.

CLINICAL: at 5.30 P.M. (Cases at 5 P.M.)
Cases will be shown.
OPHTHALMOLOGY: at 8.30 P.M. (Cases at 8 P.M.)
Cases: The following will be shown by:—
Dr. Rayner Batten: Calcareous Degeneration of Eye with Deposits on the Iris.
Dr. J. A. Valentine: A Cyst of the Retina.
Exhibit:
Mr. Williamson-Noble: A Plane Glass Retinoscope.
Presidential Address: Mr. A. L. Whitehead.
Paper:
Mr. N. Bishop Harman: A Visual Standard for School Teachers.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, Oct. 9th.—5 P.M., Opening Lecture, Sir Charles Ballance: Some Surgical Cases.
TUESDAY.—10 A.M., Dr. Paterson: Demonstration of Medical Cases. 12 noon, Mr. Sinclair: Surgical Diseases of Abdomen. 4.30 P.M., Dr. Burrell: Vital Capacity.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 12 noon, Mr. Simmonds: Demonstration of Fractures. 4.30 P.M., Dr. Burnford: Applied Pathology in Diagnosis.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 12 noon, Dr. Scott Pinchin: Diseases of the Heart. 4.30 P.M., Dr. Snowden: Conversion Hysteria.
FRIDAY.—10 A.M., Mr. Dudley Buxton: Dental Department. 11 A.M., Dr. McDougal: Electrical Department. 2 P.M., Mr. Banks-Davis: Diseases of Throat, Nose, and Ear.
SATURDAY.—9 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Mr. Simmonds: Orthopædic Department.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

NORTH-EAST LONDON CLINICAL SOCIETY, Prince of Wales's Hospital, Tottenham, N.
THURSDAY, Oct. 12th. 8 P.M., Annual Dinner at the Prince of Wales's Hospital.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.
POST-GRADUATE COURSE: OCT. 9TH–DEC. 6TH, 1922.
CLINICAL LECTURES AND DEMONSTRATIONS.
MONDAY, Oct. 9th.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., Clinical Lecture: Dr. James Taylor.
TUESDAY, Oct. 10th.—2 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Lecture:—Paralysis Agitans: Dr. Risien Russell.
THURSDAY, Oct. 12th.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., Lecture:—Pituitary Disorders: Dr. Kinnier Wilson.
FRIDAY, Oct. 13th.—2 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Lecture:—Aural Vertigo: Mr. Scott.
Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.
Lectures on NEURO-OPHTHALMOLOGY, by Mr. Leslie Paton, will commence Oct. 18th. N.B.—Not more than fourteen Candidates can attend this Course.

Lectures on NEURO-PATHOLOGY, by Dr. J. Godwin Greenfield, will commence Oct. 16th.

The fee for the whole Course, including Mr. Puton's Lectures, is £14 14s.; but these Lectures may be taken separately for a fee of £6 6s. Any part of the Course may be taken separately at a special fee. Special arrangements will be made for those unable to take the whole Course. Fees should be paid to the Secretary of the Hospital at the office on entering for the Course.

C. M. HINDS HOWELL, Dean of Medical School.

ST. JOHN'S HOSPITAL, 49, Leicester-square, London, W.C.

THURSDAY, Oct. 12th.—5 P.M., Dr. W. Knowsley Sibley: Chesterfield Lecture, General Principles of Treatment.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, Oct. 12th.—4 P.M., Dr. Cockayne: Asthma. (Free to Medical Men.)

LONDON LOCK HOSPITAL, 91, Dean-street, W., and 283, Harrow-road, W.

TUESDAY, Oct. 10th.—2.30 P.M. (Dean-street), Mr. J. E. R. McDonagh: Treatment of the Complications of Gonorrhœa.

WEDNESDAY.—3 P.M. (Harrow-road), Mr. Ernest Lane: Treatment of Syphilis by Trépol, Arsenical Compounds and Intravenous Cyanide of Mercury. 5 P.M. (Dean-street), Mr. F. Juler: Syphilitic Affections of the Fundus Oculi.

THURSDAY.—4.30 P.M. (Dean-street), Mr. Swift Joly: Treatment of Acute Gonorrhœa in the Male.

FRIDAY.—4 P.M. (Dean-street), Mr. Johnston Abraham: Treatment of Gonorrhœa in the Female.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.

TUESDAY, Oct. 10th.—4.15 P.M., Mr. J. H. Ray: Tumours of the Breast.

FRIDAY.—4.15 P.M., Dr. E. S. Reynolds: Epilepsy.

Appointments.

ADDENBROOKE, R. G., L.R.C.P. Lond., M.R.C.S., has been appointed Certifying Surgeon under the Factory and Workshop Acts for Cleobury Mortimer (Salop).

BARTLETT, G. N., M.B., B.S. Lond., M.R.C.S., L.R.C.P. Lond., Medical Superintendent at the Derby County Asylum.

HANCOCK, B. F., M.R.C.S., L.R.C.P. Lond., House Surgeon to the General Hospital, Tunbridge Wells.

SIMPSON, J. V. A., M.D., B.S. Lond., M.R.C.S., L.R.C.P. Lond., D.P.H., Assistant School Medical Officer to the City of Leicester Education Committee.

SOMERFORD, ANNIE E., M.B., Ch.B. Manc., Assistant Director of the Clinical Laboratory, Manchester Royal Infirmary.

STAFFORD, H., M.B., Ch.B. Manc., Resident Medical Officer to the Barnes Convalescent Hospital.

THOMAS, GLEN, L.M.S.S.A., M.B., Assistant Medical Officer to the Cambridge Mental Hospital.

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road, E.—H.S. £150.

Birmingham University.—Lecturer in Physiological Dept. £300.

Bournemouth, Royal National Sanatorium for Consumption, &c.—R.M.O. and Clin. Tub. O. £570.

Bramshott, Hants, King George's Sanatorium for Sailors.—Med. Supt. £600.

Bristol Royal Infirmary.—Hon. Ophth. S., Med. Reg., and Obstet. Reg.

Chelmsford Borough.—M.O.H. and School M.O. £700.

Colindale Hospital, Hendon, N.W.—Sen. Asst. M.O. £645.

East London Hospital for Children, &c., Shadwell, E.—H.S. and H.P. Eahc £125. Res. M.O. £200.

East Suffolk County.—Asst. Tub. O.'s. £500.

Evelina Hospital for Children, Southwark, S.E.—Hon. P.

Exeter City Mental Hospital.—Med. Supt. £700.

Folkestone, Royal Victoria Hospital.—R.M.O. £150.

Hampstead General and North-West London Hospital, Haverstock Hill, N.W.—S. and P. to Out-patients.

Hong-Kong University.—Prof. of Med. £800.

Hospital for Consumption and Diseases of Chest, Brompton, S.W.—H.P.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S. H.P. H.P. and Asst. Cas. O. Each £50.

Hull, Poor Law Institution and Hospital.—Locum Tenens. £10 10s. weekly.

Hull Royal Infirmary.—Hon. Radiologist.

Italian Hospital, Queen-square, W.C.—Hon. S. to Throat, &c. Dept.

Kensington Dispensary and Children's Hospital, 49, Church-street, W.—Res. M.O. £150.

Leavesden Mental Hospital, King's Langley, Herts.—Med. Supt. £800.

Leeds Maternity Hospital.—University Tutor in Obstetrics and Res. M.O. £300.

London County Mental Hospital Service.—Seventh Asst. M.O.

London Hospital, Whitechapel, E.—Asst. S.

Manchester, Monsall Fever Hospital.—Second and Third Asst. M.O.'s. £300 and £250.

Margate, Royal Sea Bathing Hospital.—S. £200.

Newcastle-upon-Tyne, Parish of.—Res. Deputy Med. Supt. and Asst. M.O. £400.

Newcastle-upon-Tyne, Royal Victoria Infirmary.—H.P.'s and H.S.'s. Each £50, except H.S. to Out-patient Dressing Dept., which is £100.

Northampton, St. Andrew's Hospital for Mental Diseases.—Second Asst. M.O. £400.

Norwich, Norfolk and Norwich Hospital.—Asst. Path. £300.

Paddington Green Children's Hospital, W.—H.P. and H.S. Each £150.

Peppard Common, Oxon, Sanatorium for Women and Children.—Asst. M.O. £350.

Plymouth, South Devon and East Cornwall Hospital.—H.S. £200.

Poplar Metropolitan Borough.—Asst. Tub. O. £500.

Prince of Wales's General Hospital, Tottenham, N.—Hon. Anæsthetist. £20.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—Two H.P.'s and Asst. Cas. H.S. Each £100. Also H.S. and Cas. H.S. Each £100.

Rainhill, Lancs, County Asylum.—Asst. M.O.'s. £300. Also Temp. Asst. M.O. 7 guineas weekly.

Rochester, St. Bartholomew's Hospital.—Res. H.S. £250.

Royal Chest Hospital, City-road, E.C.—P.

Royal Free Hospital, Gray's Inn-road, W.C.—Clin. Asst.

Royal Northern Hospital, Holloway-road, N.—H.P. and H.S.'s. Each £150. Also Cas. O. £200.

Salford Union Infirmary, Hope, Pendleton, nr. Manchester.—Second Res. Asst. M.O. £350.

University College Hospital, Gower-street, W.C.—Second Clin. Asst. in Child Welfare Dept.

West Riding of Yorkshire County Council.—Tub. O. £750.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointment: Meriden (Warwick).

Births, Marriages, and Deaths.

BIRTHS.

BELL.—On Sept. 23rd, at Chandos, Hart Hill, Luton, the wife of Dr. R. D. Bell, M.A., M.C., of a daughter.

COKKINIS.—On Sept. 30th, at Cranbrook-road, Ilford, to Enid, the wife of A. J. Cokkinis, M.B., B.S. Lond., F.R.C.S. Eng.—a daughter.

MARRIAGES.

BURNISTON—SCORFIELD.—On Sept. 26th, at St. Michael's Church, Chester-square, London, Surg.-Captain H. S. Burniston, C.M.G., Royal Navy, to Bertha Stanley Scorfield, younger daughter of the late Edward Scafe Scorfield and Mrs. Scorfield, of Bournemouth.

CHAPMAN—STEWART.—On Sept. 25th, at West Church, Ballymena, Percival David Hartrop Chapman, M.B., B.Ch.Cantab., of Marine House, Bridlington, Yorks, youngest son of Dr. and Mrs. Charles W. Chapman, of 121, Harley-street, and Highwood Coombe, Mill Hill, to Anne, elder daughter of John Stewart, Esq., and Mrs. Stewart, of Newtowncrommelin, Co. Antrim.

ELLIS—WINTER ROSE.—On Sept. 25th, at Quendon Church, Arthur W. M. Ellis, B.A., M.B., M.R.C.P., to Winifred Winter Rose, widow of Captain A. Winter Rose, M.C.

FROBISHER—NAPIER.—On Sept. 27th, at St. Stephen's Church, Gloucester-road, Captain Martin Frobisher, R.A.M.C., to the Honble. Augusta (Rita) Napier, only daughter of Lord and Lady Napier and Ettrick, Thirlestane Castle, Selkirk, N.B.

GORST—ILLINGWORTH.—Sept. 30th, at the Parish Church, Shotwick, by the Rev. F. R. Wansborough, B.D., Philip Eldon Gorst, M.D., Ch.B., M.R.C.S., L.R.C.P., son of Mrs. Gorst and the late Philip T. Gorst, of Liverpool, to Mary Ethel Illingworth, M.D., Ch.B., M.R.C.S., L.R.C.P., B.Sc., D.P.H., younger daughter of Mrs. Illingworth and the late Alfred Illingworth, of Oxton.

DEATHS.

GOODLIFFE.—On Sept. 26th, at Kingston, Jamaica, John Henry Goodliffe, M.D., formerly M.O. Uganda Protectorate.

LUKE.—On Sept. 25th, at St. Brenda, Clifton, Bristol, Thomas Davey Luke, M.D., F.R.C.S. Edin., of Emsworth House, Clevedon, Somerset, aged 49.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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THE CONTROL OF TINEA CRURIS.

BY NORMAN HALLOWS, M.D. OXF., M.R.C.P. LOND., D.P.H. OXF.,
MEDICAL OFFICER TO MARLBOROUGH COLLEGE.

THIS disease has, unfortunately, become much more prevalent in this country since the recent war, owing partly to the reintroduction of the infective agent from the East, and also to the prevalence of factors favourable to the spread of infection associated with conditions of life incidental to warfare. Although the disease is in no way a danger to life and but seldom to health, it cannot but be regarded as uncleanly and by reason of its rapid spread if disregarded among the members of a community such as a public school, it is highly desirable that active measures should be adopted for its prevention and control. There are certain difficulties in the control of this disease among the general community, for owing to the very slight inconvenience caused to the patient the condition may not even be brought to the notice of the medical practitioner, or when his advice is sought the diagnosis may be obscured owing to a course of home remedies having been previously exhibited. Again, as the disease is of such a mild nature, vigorous treatment and disinfection with the resultant upset of the patient's daily life may appear unreasonable, and the patient may be led to regard a temporary amelioration of the condition as a permanent cure. The nomenclature of the disease is partly to blame in this respect, for such names as eczema marginatum, tinea marginata, tinea cruris, dermatitis of the thigh, ringworm of the thigh, and dhobie itch suggest different modes of treatment and degrees of infectivity. Sabouraud investigated the causative fungus, which he ascribed to the genus *Epidermophyton*. He recognised that many different species were concerned in the production of the disease under notice and also of the intertriginous condition, only too often regarded as eczema, between the little and adjacent toe and sometimes affecting a large area of the forepart of the foot. When a fungus is the causative agent in an affection of the skin it would appear misleading to speak of an eczema or a dermatitis. The fungi of the genus *Epidermophyton*, as their name implies, inhabit the superficial layers of the skin, more particularly the stratum corneum with probably some penetration to the subjacent layers, but the mycelial elements do not invade the hair follicles or hairs. The *E. cruris* vel *inguinale* is found in a large proportion of the cases of dhobie itch which is so common in India. Males are said to be attacked in larger proportion than females, while before puberty cases are but seldom seen, although the writer has noted two cases in young boys where curiously enough the skin of the mons jovis was alone attacked. The conditions incidental to school life may be at times favourable to the spread of the disease, more particularly with regard to the arrangements for changing the clothes prior to playing games and for washing after exercise. The moisture of the skin and the rubbing of flannels associated with strenuous exercise are factors which have also to be considered. In this connexion it is worthy of note that the disease is not often seen in boys who for any reason are prevented from playing games at school. Among other sections of the community those who change their clothes less frequently and carry out their ablutions at longer intervals, being thus less exposed to infection, are less often attacked.

Diagnosis.

In its earliest stage the disease is recognised as a small slightly raised red area or papule; this enlarges concentrically, giving rise to a ring with raised hyperæmic periphery and paler flat centre. As the lesion becomes older the ring enlarges its circumference leaving in the centre an area of pink or brownish roughened or scaly skin. The appearance of this typical lesion becomes modified according to its situation. The commonest area affected is at the junction of the scrotum and thigh, thence enlargement takes place downward on the inner surface of the thigh so that ultimately, in cases of some standing, areas nearly as large as the palm of the hand may be found. A not unusual situation is the skin of the natal cleft adjacent to the anus. Between the little and adjacent toe the appearance is different, the skin lining the cleft appears whitish or grey, thickened and desquamating, while it is usual to find in addition some spread along the plantar surface of the remaining toes. The importance of this desquamation will be realised as being a factor in the dissemination of the disease. With the exception of the hairy scalp, nails, and mucous membranes nearly every part of the integument appears liable to infection, so that when treating a case it is of the greatest importance to make a very thorough examination of the patient's whole body at frequent intervals. The appearance of the lesions in the untreated state is usually so typical that to the experienced there is seldom any doubt as to the identity of the disease, but occasionally the manifestations are not typical, and in such cases a microscopic examination of material obtained from the younger parts of the growth may establish the diagnosis. A microscopic examination does not yield a positive result in all cases even if the greatest care be taken, and for this reason the value of a negative finding should not be over-estimated. In such cases if a confirmation of the diagnosis be required an endeavour should be made to cultivate the fungus on suitable media. There are conditions which may be confused with tinea cruris—namely, psoriasis, eczema seborrhoicum, and pityriasis rosea—the first occurs most frequently where tinea cruris is found most rarely owing to the coarseness of the skin on the knees and elbows, while the scaliness has a different appearance; in the second the scales are greasy and there are usually projections on the surface and absence of the very marked periphery; the herald patch, the distribution of the secondary lesions and the character of their borders usually serve to distinguish the circinate and macular manifestations of pityriasis rosea.

Treatment.

As has already been stated, the diagnosis is in certain cases a matter of some uncertainty, particularly where remedies have already been applied; in these cases it is usually in the interests of the patient and of the community to err if at all on the side of safety and give a course of treatment specific for tinea cruris. In treating a case it is necessary to bear in mind that the infective agent is a fungus which is not only very resistant to moderate degrees of temperature and to mild antiseptics, but is also capable of being transferred by clothes which have come in contact with the lesions, thereby causing reinfection of the patient. For this reason adequate disinfection of the patient's clothing and bedding is to be regarded as an essential part of the treatment. The most satisfactory and certain way of effecting this is by low pressure steam disinfection; disinfectants in dilutions suitable for woollen garments are none too satisfactory. Perhaps the best substitute for pressure steam disinfection of these articles is washing with soap and water followed by hot ironing, while for trousers damping and hot ironing may be employed. Boots and shoes should be well moistened inside with pads of cotton wool soaked in a powerful chemical disinfectant such as formalin or lysol. The cure of the patient's lesions is not usually a difficult matter, nor is there any reason why it should be so, when one realises that the infection is only skin deep, and that in some cases at least a rapid cure would be effected by removing the skin with blistering fluid. It is usual to employ less drastic remedies which remove the superficial layers of the skin more gradually and cause antiseptics to penetrate to a depth sufficient to kill the deeper lying parts of the fungus. Strong solutions of iodine may be used on the body, but the curative effect is not very rapid and a severe iodine dermatitis may occur in susceptible persons. In toe infections iodine will be found to give good results, attributable partly to the dehydration caused by the alcohol employed. One of the most satisfactory reagents is unguentum chrysarobini B.P., which, if it be applied thickly on lint twice daily, will effect a cure in six days in most cases. A mild dermatitis usually occurs, but this is quickly relieved by the application of zinc ointment at the end of treatment. To carry out the treatment effectively it is usual for the patient to be isolated for the period of treatment and to wear an old nightshirt to avoid displacement of the dressings and staining of the ordinary clothes. Another form of application commonly used is an ointment composed of salicylic acid ℥ss–℥i to ℥i of benzoated lard. This has the great advantage of not staining the clothing, but the period of treatment must be extended to two or three weeks, or even longer in the case of infection between the toes. A salicylic collodion will be found useful in dealing with small or scattered lesions and preventing spread of the infection to other parts of the body. Solutions of formaldehyde kill the fungus very quickly, but their application is painful and great destruction of the tissues may result in susceptible cases. It is my intention to try the effect of ionic medication in these cases. As the infective agent is superficially situated it is to be expected that sufficient penetration would be obtained. A case cannot be regarded as definitely cured until the skin of the treated area is again normal in appearance and the conditions for preventing auto-reinfection have been satisfied.

Prevention.

The treatment and control of isolated cases is not a difficult matter, but in dealing with a susceptible community such as a public school the case is more complex, the issues wider, and the modes of transmission considerably multiplied. The first essential is to ensure that cases are brought under treatment as early as possible, and to this end propaganda work is required to enlighten both boys and their parents and to request active coöperation. The success or otherwise

of this can be estimated by an inspection of the whole school as often as seems desirable; should the results not come up to expectations further measures may be adopted to deter delinquents. Provision must be made for individuals to keep separate their towels, sponges, and clothing, and in addition the wearing of slippers is to be encouraged to prevent the dissemination of infection from lesions of the feet. Those responsible for discipline and for the observance of elementary hygienic principles among the various sections of the community should be informed fully as to the nature of the disease and the means by which it may be transmitted, for without their active support and the coöperation of all concerned it is hardly possible, in such a community, to control the incidence of tinea cruris.

PREVENTION OF STRIÆ GRAVIDARUM.

IN a paper read before the Section of Gynæcology and Obstetrics at the recent annual meeting of the Medical Society of the State of California, Dr. G. Carl H. McPheeters,[1] of Fresno, California, described a method for prevention of striæ gravidarum, diastasis of the recti muscles, and ptosis of the breasts in pregnancy, based on its use in 500 cases. Dr. McPheeters maintains that child-bearing need not spoil the figure of any woman who will coöperate with the physician during her pregnancies, whether one or many, and that it is the duty of the physician to show her the means by which this disfigurement can be prevented. The prevention of striæ should commence in the second or third month of pregnancy; it will not usually be entirely successful if begun later than the fourth month. The method consists in persistent, systematic massage with both hands of the entire abdomen and hips for at least 10 minutes every night and morning until confinement. The massage is performed by the patient herself or her husband, the skin being divided into imaginary vertical slips, which are massaged in turn in a transverse direction, commencing in the groin or at the pubes, and working upward to the costal margin. The hips are treated similarly. Deep massage is carried out with the curved fingers of both hands, the fingers being pressed in deeply and the skin pulled vigorously until it smarts. Oil need not be used until after the massage, to preserve the soft texture of the skin. In all the cases in which this massage was systematically carried out the formation of striæ was prevented. Moreover, the abdominal skin at term, instead of being tightly drawn like parchment and broken by numerous striæ, is soft and velvety and can be picked up by the examining fingers and stretched like rubber. Even patients who begin massage later or put on much weight during pregnancy avoid the wide striæ of those who have no treatment at all, and often show only small striæ over the hips and just above the groins. Backache, pain in the groins, persistent frequency of micturition, and fatigue on slight exertion are obviated by wearing a suitable maternity corset or abdominal supporter, which also prevents diastasis of the recti muscles with the accompanying enlargement of the umbilical space. The abdominal wall regains its former shape and tone quite rapidly after delivery; and finally, fewer patients are left with visceroptosis. Daily massage of the breast followed by application of hot and cold compresses alternately for five minutes and the wearing of a specially designed mammary brassière are also recommended by Dr. McPheeters, who has found that breast-feeding has been possible in 95 per cent. of the cases so treated, has been prolonged beyond the average time, and that the natural symmetrical outline was preserved instead of the flabby, pendulous breasts which occurred when no support was provided.

MOSCOW SCHOOL OF TROPICAL MEDICINE.

MEDICINE does not go wholly without recognition even by the Communists of the Soviet State. We have just received a new medical journal emanating from Petrograd and call attention here to a tropical medicine school at Moscow, opened two years ago, and described by the Director, Prof. E. I. Marzinowsky, in *Archiv für Schiffs- und Tropen-Hygiene* for August. Russia is so large a country, and its Turkestan and Trans-Caucasian provinces stretch so far to the southward, that tropical diseases have for it very serious economic importance. Before the war malaria was credited with producing 5,000,000 cases in Russia every year; since the war the number is supposed to be 10,000,000, and in Moscow alone 100,000. In Moscow infections occur even by the subtertian, the so-called tropical parasite. There are many protozoal diseases of cattle, there is kala-azar at Tiflis, and so many other tropical diseases occur that it has long been obvious that a tropical medicine school should be established, and indeed an unsuccessful proposal to that effect came before the last Duma. Actually it was set going in 1920. At present the Director is also acting as chief of the division which concerns itself with protozoal diseases; Prof. I. A. Smorodinzew superintends the division which concerns itself with chemotherapeutic drugs or remedies; an entomological section (disease-bringing insects and their prevention) will shortly be opened. The division of parasitic helminthology is in the hands of Prof. K. I. Scriabin, and will in Russia be kept very busy. There is a hospital of 40 beds for men with protozoal diseases as well as a large veterinary school in Moscow already; hence the tropical medicine school does not specialise much in this direction. A large museum is available with appropriate workrooms and a large hall where a kinematograph film can be shown; also it has a projection microscope. The first volume of *Transactions* is now in the press. Outside missions have not been forgotten. A number of young doctors in 1921 took a course at the school before they went to Turkestan. It is clearly realised that great help can be given to the prevention of these diseases by instruction of children in elementary schools.

HEALTH OF PRISONERS IN INDIA.

WE learn from the great annual report of the Public Health Commissioner that the total population in the jails of India (excluding the Andaman Islands) in 1920 was 106,951, as compared with 115,499 in 1919, and the decennial average of 103,987. On the whole economic conditions were favourable throughout the country, the prison population was low, and the general health on admission to jail above the average. The admissions to hospital were 733·7 per 1000, compared with 781·5 in 1919, and 683·3, the decennial mean; the death-rate (19·99), compared with 26·19 in 1919 and 21·73 for the decennium, "may be considered very satisfactory." The increase in hospital admissions (compared with the decennial average) "is due to the greater freedom in admitting cases which need observation during the process of cure. This is notably the case with reference to ankylostomiasis." The hospital admission ratio varied from 385·1 in the Central Provinces and 393·3 in Madras Presidency to 965·4 in Bombay and 1352·5 in Bengal; the death-rate from 15·37 in the Punjab and 17·06 in the United Provinces to 25·0 in the Central Provinces and 29·10 in Bihar and Orissa. The high mortality in this last-named province was due to the bad health of a large proportion of the prisoners on admission (owing to scarcity, or even famine), while in the Punjab economic conditions were satisfactory and there was freedom from malaria. In the United Provinces the Agra central jail had a death-rate of 29·94 (influenza and malaria being prevalent), while in Lucknow central prison the ratio was only 6·09 per 1000.

In the Burma jails 52·32 per cent. gained, and only 18·39 per cent. lost, weight; the death-rate was 19·92 per 1000. At Bombay the common prison had a malaria admission rate of 709·7 per 1000, "proving how malarious Bombay city still remains"; but there was not a single death from this cause. In Madras Presidency, of the total prisoners discharged during the year 70 per cent. had gained in weight. At Cannanore jail 97·1 per cent. of the prisoners were found to be infected with ankylostoma. There was very great variation in the jail mortality in Bengal; at Comilla and Berhampur the ratios were 5·02 and 5·65, while at Jalpaiguri and Malda they were 62·24 and 78·95; the commonest cause of death in these jails is said to be malaria. At Bhagalpur central jail, in Bihar, a strenuous anti-dysentery campaign has been carried on since May, 1919; there were 628 admissions to hospital and 33 deaths from this cause in 1918; in 1919 (January to June) the admissions and deaths numbered 222 and 13; from July to December the admissions were 59, with no death; and during 1920 the admissions were 119, with not a single death. "Bacillary dysentery, which is probably responsible for most of the epidemic dysentery in jails, can certainly be controlled by the use of Shiga vaccine. Amœbic dysentery and the dysenteries due to *Ankylostomum duodenale* and other worms can be recognised by careful microscopic examination and appropriate treatment."

As far as Bengal is concerned the information can now be supplemented by the report of Lieut.-Colonel F. S. C. Thompson, I.M.S., for the year 1921, which has just reached us. (Calcutta: Bengal Secretariat Book Depôt. 1922. Rs.6–9.) The year 1921 was one of unusual prison activity, due in part to the non-coöperation movement and in part to the reforms recommended by the Indian Jails Committee, some of which were put into force in spite of the difficult situation. From Calcutta alone 3667 non-coöperation prisoners were admitted during the year, and in March 669 out of 969 prisoners escaped. Juvenile prisoners reached a maximum during the year, but this reproach will be removed when the Bengal Children Act of 1922 comes into force, for under this Act no person under the age of 14 years can be imprisoned for any offence whatever. Admissions to hospital for dysentery and malaria diminished substantially during the year. Tuberculosis increased still further, a reflection on the overcrowding of the prison population, although a majority of cases, it is stated, were admitted already infected. The general prison death-rate for the year 1921 was only 16 per mille.

[1] American Journal of Obstetrics and Gynæcology, August, 1922.